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A Personalized Approach: Discussing Food in Prevention of Dental Disease

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Dental disease crosses social, economic, racial, geographic and age lines without discrimination. In a recent Texas-Louisiana survey of over 6,000 children and adults, it was found that: 20 percent wore dentures of some kind; 90 percent needed fillings or extractions; 45 percent had some degree of periodontal disease; and 18 percent had pain when biting or chewing.[1]

The insidious characteristics of dental disease tend to lull an individual into a sense of false security until pain ensues in the late, and often irreversible, stages. To the average person, problems with teeth seem inevitable except for a fortunate few.

Most people are unaware that all dental decay and most gum disease is preventable. The dental profession has reiterated that good oral hygiene, control of food habits, use of fluorides and regular visits to the dentist provide the means for controlling dental disease. However, for devious reasons, there is little appreciation of these preventive measures.

At the University of Texas Dental Branch a broad program has been launched in teaching acceptable preventive practices and the etiology of dental disease. A major emphasis in this program is applied nutrition. Here, dental students and auxiliary personnel are provided learning experiences through counseling with their dental patients on food habits. From these direct experiences they are able to: (1) relate patient dental problems to individual eating habits by discussing them in a personalized manner; (2) recognize dietary inadequacies and help motivate patients toward specific changes in meal planning, food purchasing and diet habits; and (3) work with dental and allied health personnel in prevention education programs.

Dr. Kenneth Madsen

The Interview Technique

Merely giving the patient food facts related to the prevention of dental disease does not change his habits. Therefore a personalized approach, based on an organized interview technique, was adopted. Through discussion the patient is enabled to define his own dental-diet problem, and helped to discover solutions.

Inherently the technique facilitates communication so that information about diet, oral hygiene and the role of oral bacteria becomes personally meaningful. Once an individual conceptualizes the specific practices he must follow to assure good dental health, his desire to change habits is enhanced.

The interview occurs in a private, relaxed atmosphere conveying warmth and acceptance to the patient. Alertness to feelings, attitudes and reactions aids the interviewer to serve as the "helping vehicle" for guiding the discussion.

"Beginning where the patient is," and listening to him, helps establish the rapport critical for patient cooperation. If the interview degenerates into a one-way "information" session, the effectiveness of communication and patient response are unpredictable.

Prevention Education Procedure

A 5-day dietary record serves as essential information for the interview. It aids in patient participation since it focuses clearly on his own eating patterns and food choices. The record also serves as a screening device for nutritional adequacies. Further, it provides the best context within which food, oral hygiene, fluorides and dental treatment can be interrelated. This

Dr. Louis DiOrio

approach meets the needs of a dental office, but is sufficiently flexible to be utilized by all health and education personnel. A series of interviews can achieve the desired goals:

1. Establish the Need

The interviewer asks the patient if he is interested in learning how to control his dental problem. He then suggests to the patient that what and how he eats is related to his dental health. The interviewer then helps record the patient's previous day's diet, so he will understand how to complete accurately the other four days.

2. Discuss Food Habits

A worksheet is used in the second interview as a guide for discussing the completed diet record. After findings and basic information have been recorded, this sheet serves as personalized information for the patient. It has seven main topics: *The Dental Problem* (patient's particular problem, information about harmful results of bacteria acting on oral food residues); *The Food Pattern* (meals and snacks per day, favorite snack, snack eaten most often); *Oral Hygiene* (when the patient brushes, flosses, rinses); *What Can Be Done* (what the patient can do to prevent dental disease); *What Will Be Done* (what the patient says he will do, written realistically and practically); *Old Habits* (quick review); *New Habits* (review and reinforce).

3. Assess Nutritional Adequacy

A different worksheet is used to an-

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Four issues annually: February, April, October, December

Nutritional Status, 1957-1967

Fifty studies of nutritional status, covering 30,000 persons, and 60 studies on dietary evaluation are summarized and analyzed. It was concluded that nutritional deficiencies do occur in certain age groups and certain areas. There is a high percentage of anemia in preschool children and pregnant women, and various groups showed low blood or urine levels of one or more vitamins. The quality of nutrition was related to economic status and level of education. Milk, citrus fruits and green and yellow vegetables were the foods most needed to improve diets.

Kelsay, J. L. *A Compendium of Nutritional Status Studies and Dietary Evaluation Studies Conducted in the United States, 1957-1967. J. Nutr. 99:119 (Suppt. 1, Sept.) 1969.*

Psychological Forces and Obesity

Research has indicated that the eating behavior of overweight persons is affected more by external than internal stimuli. This led to a pilot study in which techniques for developing self-control in the presence of external stimuli were successfully used in reducing weight in adults. Patients began by exercising control over simple patterns of eating, such as interrupting each meal for a certain period, then progressed to diet changes increasing in scope and difficulty. The decision to undertake a reducing program is the patient's, but it is the professional's responsibility to acquaint him with the facts about obesity so that he can make a rational decision. The measures that could be used in adapting these concepts to nutrition education for children are discussed.

Rosenstock, I. M. *Psychological Forces, Motivation and Nutrition Education. Amer. J. Pub. Health 59:1992 (Nov.) 1969.*

Nutrition and Food Science: A Self-Instruction Lab

By Mrs. Sarah Short, Instructor, College of Home Economics, University of Syracuse, New York

A Self-Instruction (SI) Laboratory is the solution to a problem in our beginning Nutrition and Food Science course. It is difficult teaching students who have a wide variety of experiences in previous courses. The SI system enables each student to proceed at an individual pace.

Using behavioral objectives for the course, we initially planned media for self-instruction in the laboratory part of the course. Eighteen film loops, lasting between two and four minutes, were filmed in our food laboratory for the purpose of instructing units on batters and doughs. Colored slide series were prepared to show vegetable pigment changes during cooking, enzymatic browning of fruit and other subjects.

We also used other available filmstrips. Audio tapes were prepared to accompany the slides and filmstrips. Information sheets were written for each unit so that the student could devote her attention to the media and not have to take notes.

A small classroom has been converted for use as our self-instruction laboratory, equipped with 10 carrells, each with a super 8 mm. motion picture projector, a combination slide-filmstrip projector and a tape recorder fitted with headphones.

At the beginning of the semester, each student is pretested on the laboratory and lecture material in the course. On the basis of the pretest performance, only 5 percent of the students are excused from going through one or more of the conceptual units.

Immediately following each self-instruction sequence, the student takes a 10-item post-test. After listening and viewing, 97 percent pass the post-test, that is, score 80 percent or more of correct answers.

The student then proceeds to the foods laboratory to prepare a product. Both the SI laboratory and the food laboratory are staffed with graduate assistants who answer students' procedural questions and assist with equipment.

Our experiences indicated that self-instruction materials can successfully take the place of the teacher-lecture-demonstration type of laboratory instruction. Therefore, we decided to integrate lecture material into the laboratory material and "mediate" the whole course, that is, transfer the material onto film and tape. The course has previously consisted of two lectures and one 3-hour laboratory period a week.

All lectures for the course were recorded along with an explanation of material viewed on the films, slides and filmstrips. Background music, commercials and lines from TV shows were added to give light interludes during the taped lectures.

So that the student is not just listening for extended periods, she is directed to view films, slides and filmstrips at various points during the recorded lectures. For each lecture, worksheets are used, containing objectives for the unit, an outline of the lecture, pertinent questions to answer, diagrams to label and directions for products to be made in the food lab.

One unit of the course is now being taught by computer-assisted instruction. We have worked out a computer program to teach nutrition following the guidelines of the Daily Food Guide. The student types one key word, and is given information on the printout. She may be asked questions or branched to other information, depending on her answers.

Attitude scales are being administered during this "mediated" course, to note changes in attitude toward home economics, a beginning Nutrition and Food Science course, and "mediated" lectures. These attitudes are then related to student achievement, as assessed by pre- and post-lecture and laboratory tests.

Our staff feels that development of the SI laboratory has been well worth the cost in time and money. While we are still evaluating the total effect of these techniques, initial response indicates success.

The Dental Profession and Nutrition Education

By Mrs. Margaret M. Hinkle, Registered Dietitian, Columbus, Ohio

The food we eat begins its complex metabolic journey in the mouth. The dentist, therefore, is a logical person to give guidance on food decisions. However, emphasis in dentistry has traditionally been on technical repair and replacement, and the dental profession is only now realizing the importance of prevention, including education in food and nutrition.

My husband is a practicing dentist. Through him, I know many of the problems faced by the dental profession. Recently, I have had opportunities to discuss the nutrition-dentistry relationship with groups of dentists and auxiliary dental personnel.

My involvement began during a social conversation with a dentist friend. He found poor food habits prevalent among his patients, and asked my advice about a possible relationship between poor diet and hypersensitivity to dental treatment.

I indicated that surveys have shown calcium is apt to be below recommended allowances in the diet of many Americans. Since one of the functions of calcium is regulation of the excitability of nerves, there might indeed be a relationship between nutritional status and susceptibility to dental pain in an individual. Further, a low blood sugar level can lead to faintness, undue apprehension and even an uncooperative attitude.

I also suggested that my friend familiarize himself with the four food group concept, and use this as a tool for checking a patient's nutritional intake. This dentist arranged for me to share my thoughts with a wider group.

Presentations to Dental Profession

Since then, I have made presentations to several different dental groups, exploring with them the need for communicating nutrition to dental patients. At one of these presentations, I recommended that the dentist:

- Evaluate patients' diets, especially those with high caries susceptibility.
- Seek nutrition information from recognized authorities.
- Obtain monthly or quarterly nutrition information bulletins that are brief, authoritative, current and readable.

My husband has participated over a 10-year period in a nationally recognized postgraduate dental study group. I have spoken at several seminars held by this group; participants include dentists and their wives.

In these sessions, the four food group concept has been an excellent vehicle for discussion. I explain the grouping of foods according to their nutrient contribution. I also describe "empty calories" and why fats, oils, sugars and sweets are not emphasized in the food guide. This helps show that a poor diet from a dental point of view may also have serious effects on total health.

Through the auxiliary personnel in my husband's office, I have been invited for a number of years to teach nutrition to classes of dental assistants seeking to meet their certification requirements. This course has involved dialog and discussion on nutrition and health. I have tried to generate enthusiasm by covering aspects such as food advertising and some of the questions I have answered as a participant in the Columbus Dial-A-Dietitian program.

My husband and I have recently appeared as a team before dental and dietetic groups. He covers some of the problems faced by the practicing dentist, while I suggest ways "chairside nutrition education" can be applied by the dentist and auxiliary personnel. Specifically I advise the presence and use of visual aids, such as *A Guide to Good Eating,* in the dental office.

The outstanding need at this time seems to be greater understanding of normal nutrition concepts by the dental profession, coupled with techniques for skillful counseling of the individual patient.* As a dietitian, I feel that members of our profession can make a significant contribution in advising and assisting the dental team become nutrition educators.

*see lead article—Ed.

Protein and Tooth Development

Major reductions in weaning weights and delays in eruption of the third molars occurred in the offspring of rats subjected to either a marginal protein intake during pregnancy and lactation, or a protein-free diet for a 5-day period during lactation. Also, offspring of rats subjected to prolonged marginal protein deficiency tended to have abnormal cuspal patterns of the third molars and increased dental caries incidence, compared with controls. When the baby rats were continued on a low-protein diet after weaning, delay in eruption of the third molar was increased and gain in weight further retarded.

Shaw, J. H. *Influence of Marginal and Complete Protein Deficiency for Varying Periods during Reproduction on Growth, Third-Molar Eruption and Dental Caries in Rats. J. Dent. Res. 48:310 (March-April) 1969.*

Trace Elements and Dental Caries

In addition to fluoride, other trace elements such as molybdenum, vanadium and strontium may possibly reduce the incidence of dental caries. Excess selenium may be cariogenic. Trace minerals may reduce caries by altering the solubility rate of the calcified dental tissues; by affecting the ecology, chemical composition and metabolism of dental plaque bacteria; by changing the morphology of the teeth; or by altering the crystallinity of the dental enamel. Animal experiments have shown the possible value of a wide variety of trace minerals in lowering incidence of dental caries, and there is limited evidence on the possible influence of such trace minerals in another major dental disease affecting man—periodontal disease.

Ludwig, T. G. *Trace Element Nutrition in Relation to Dental Disease. New Zealand Dent. J. 65:4 (Jan.) 1969.*

About the Authors

Dr. Madsen

Kenneth O. Madsen received his B.S. degree in chemistry from the University of Wyoming and his M.S. and Ph.D. degrees in biochemistry from the University of Wisconsin. Since 1958, he has been at the University of Texas Dental Branch where he is now Associate Professor of Biochemistry and Nutrition.

Dr. Madsen has a wide interest in problems related to nutritional biochemistry and has studied and published scientific articles concerned with dietary factors and other variables that influence tooth decay in humans and experimental animals. His recommendations are directed toward dental preventive nutrition. This frequently involves different considerations from usual general nutrition recommendations. Recently he has promoted the role of nutrition in dental health and the teaching of nutrition in dental schools.

Dr. DiOrio

Louis P. DiOrio was formerly an Assistant Professor of Health, Physical Education, Recreation at Illinois Wesleyan University and then at Youngstown University, Ohio. Later, after his graduation from Ohio State University School of Dentistry, he practiced dentistry for two years in Youngstown. He was appointed Assistant Professor in Nutrition at the University of Texas Dental Branch, following the completion of M.S. studies in nutrition at Massachusetts Institute of Technology. Since that time he and Dr. Madsen have been developing the clinical program in applied nutrition.

A Personalized Approach
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alyze the diet record for nutritional adequacy. Findings are discussed and specific ways to correct deficiencies are decided upon by the patient with the interviewer's help.

4. Follow up and Reinforce

A second diet record is utilized to evaluate the effectiveness of earlier guidance and to assure practicality.

Basic Principles and Recommendations

Detailed discussion of the principles and teaching materials used in the dietary aspect of the preventive program is beyond the scope of this report but is presented in others.[2,3,4,5] Briefly, the recommendations are:

- For dental caries cases with no systemic malnutrition, control of local food factors (frequency and retention of fermentable carbohydrates) is achieved through elimination and substitution of snack items.
- For a periodontal case with no systemic malnutrition, control of local food factors is again involved. Soft, sticky, retentive foods are replaced within and between meals with chewy, fibrous foods. Higher frequency of eating such items is encouraged.
- In cases of nutritional inadequacy, the dietary pattern is improved with specific food choices, using the flexible, yet simple four food group guide, *A Guide to Good Eating*. Other suggestions for acute needs are made as necessary.

Summary

Focus on an individual's diet is a convenient context for discussion of all preventive measures for good health. An individual goes to a dentist for dental care, so our approach begins with the specific dental problem. Nutritional counseling is an organized way for talking with the person about *his* dental health.

The first nutritional consideration for most dental patients is oral food factors, since these are directly related to the predominant dental diseases. Eliminating between-meal snacks or replacing them with foods compatible with dental health often results automatically in a better diet. After the patient understands local food factors, further examination of his diet for nutritional adequacy obviously becomes significant.

References

1. *Schaefer, A. E. and Johnson, O. C. Are We Well Fed? The Search for the Answer. Nutr. Today. 4:2 (Spring) 1969.*
2. *Madsen, K. O. Oral Food Residues and Tooth Decay. Food and Nutr. News. 37:1 Chicago: National Livestock and Meat Board. 1966.*
3. *Madsen, K. O. Nutritional Basis of Oral Health in Dental Biochemistry. Ed. Lazzari, E. P. Philadelphia: Lea and Febiger. 1968.*
4. *Nizel, A. E. Food Habits and their Modification for Caries Control. Nutr. News 32:1 (Feb.) 1969.*
5. *Teaching materials prepared by the authors for use in the prevention education program.**

*Available from the authors on request

Worth Reading

Adolescent Nutrition and Growth. Edited by Felix P. Heald, M.D. New York: Appleton-Century-Crofts. 1969. $7.95.

Does an adolescent's diet affect the development of atherosclerosis in adult life? Is the nutritionist a necessary part of the adolescent health team? Does psychological stress affect the nutritional status of the teen-ager? These are some of the provocative questions raised in *Adolescent Nutrition and Growth.*

Food habits formed during the teen-age years can be critical to health for the remainder of life. Juvenile-onset obesity, for instance, is known to develop into the most severe form of adult obesity, and the most resistant to treatment. The book explores fundamental issues of nutrition and growth, focusing on the adolescent growth spurt, and the correspondingly greater nutritional requirements during this period.

The book's 18 chapters are papers presented at two seminars on adolescence, held in 1966 and 1967. The contributors are eminent nutrition scientists, pediatricians and others. They include Dr. Jean Mayer, Special Consultant to the President, and Dr. Arnold Schaefer, who heads the National Nutrition Survey. A readable book, and a useful addition to the reference library.

Did You Know?

. . . that defects in dental enamel may indicate impairment of the nervous system in children?

. . . that a device with a pressurized water jet is now recognized by the dental profession as a supplementary aid to toothbrushing for effective oral hygiene?

. . . that laser beams may be used to prevent dental decay in the future? They have the effect of decreasing the permeability of tooth enamel.

. . . that warming a cow's water supply in the winter improves milk production?

. . . that 3.1 billion quarts of ice cream were produced in the U.S. in 1968?

Nutrition News

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Report from the White House Conference

By Jean Mayer, Ph.D., D.Sc., Professor of Nutrition, Harvard University School of Public Health, and Chairman of the 1969 White House Conference on Food, Nutrition and Health.

In May 1969, President Nixon called for a White House Conference on Food, Nutrition and Health. The purpose was to advise him, Congress and the American people on the development of a national policy aimed at eliminating hunger and malnutrition due to poverty, and to improve the nutrition of all Americans. In June 1969, I was appointed to organize the Conference and made a Special Consultant to the President.

Twenty-six panels and eight task forces met and discussed preliminary recommendations during the summer and fall of 1969. The panels consisted of academic, medical, industry and agriculture experts, and concerned citizens. The task forces represented special action groups, women's organizations, industrial and consumer interests, professional organizations and religious denominations.

About 800 people were involved in the preparatory work, and altogether 3,000 delegates attended and participated in the Conference. An additional 2,000 guests attended the plenary sessions. Panel and task force members met for the whole week starting Sunday, November 30, and the full Conference lasted three days, December 2 to 4.

Conference Issues

The White House Conference meant different things to different people. This was important both for general recommendations related to major national priorities, and for specific recommendations. The Conference received extensive coverage in the newspapers and on television. I would like to point out that we really had two conferences underway simultaneously.

The first conference was concerned with the social and political issues of hunger and malnutrition, and methods to enable the poor to alleviate the problems, including food stamps, commodity distribution and income maintenance.

The second conference was basically concerned with food and nutrition. It is very important that we had both of these conferences going on at the same time. We were able to recognize the link between food and nutrition and the social problems of our day. Conversely, we came to understand that the social problems of our day can be materially alleviated through a better-defined national policy on food and nutrition.

As one might expect, the news media coverage of the Conference concentrated on the social issues. Frankly, I believe they were correct at the time of the Conference in doing this, because public concern with hunger and malnutrition in America has been awakened.

However we need to get on with the business of dealing with and acting on the Conference recommendations. Coverage of the Conference now needs to focus equally on the food and nutrition questions.

Panel Recommendations

In total, about 450 separate recommendations were submitted by the panels.

I Nutritional Surveillance

The identification of undernourished and malnourished groups is basic to any program to correct nutritional deficiencies. Three panels examined the problems of surveillance of the nutritional state of the American people. They have designed a comprehensive surveillance system that could also be used to monitor the effectiveness of Federal, State and local programs, as well as activities by private groups.

Recommendations were also presented concerning administration of the system, methods, standards and personnel. The panels recommended that initial, primary attention should be given to preschool children, expectant mothers, primary school children and other categories of low-income persons.

II Vulnerable Groups

The next group of six panels dealt with nutritional problems of specific groups: pregnant and nursing women; children and adolescents; adults prone to degenerative diseases; the sick; the aging; and groups for which the Federal Government has special responsibility—inhabitants of Guam, Samoa, U.S. Trust Territories, citizens of Puerto Rico and the Virgin Islands, American Indians, Alaskan natives, migrant workers, residents of the District of Columbia, the military.

These panels stressed that special programs could only be considered on the basis of adequate capacity to obtain foods, whether by sufficient food stamps or commodity distribution, family income maintenance or a combination of methods.

All panels in this group emphasized the desirability of better health services, with a strong nutrition component. Nutrition education was considered an essential part of all special programs, though it could not replace food, or money for food. Some of the panels urged better facilities for exercise, as well as nutrition programs.

The importance of services as well as food and means was particularly noted in the care of the aging. New procedures for dealing with special geographic groups were also recommended, as well as greater emphasis on health and human values.

III Provision of Food

Four panels were concerned with various aspects of our food policies. They all directed their recommendations at simplifying legislation and regulations, to permit greater innovation by industry in the development of new and better foods, while ensuring

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better consumer protection as regards safety, quality and meaningful disclosure of content and nutritional value.

IV Nutrition Education

Nutrition education at preschool, school, university and community levels, as well as through the use of various mass media was the subject of a group of four panels.

Suggestions were made for better use of community aides, programs in popular nutrition education and constructive ways in which the media can cooperate with educators.

Again, all four of these panels predicated those of their recommendations that were specifically directed toward the poor on the availability of vastly improved food programs (including free food stamps and free school lunches) or adequate cash assistance for the needy.

As part of another group, an industry panel was concerned with promotion and advertising. Their recommendations included a number of novel methods of presenting nutrition material and portraying it in a supportive way on food labels, and in promotion and advertising.

V Food Distribution

Another four panels studied food distribution and delivery problems. Their recommendations included better methods of dealing with Government food programs and family assistance, to enable the rural and city poor to increase their food buying power.

Mass feeding programs were also discussed. The panel recommended detailed improvements and economies in methods of large-scale feeding in schools, hospitals, Veterans Administration, military and penal systems.

VI Voluntary Action

There were three panels dealing with voluntary action to help the poor. They urged measures to combat the more acute problems of hunger and malnutrition due to poverty, to improve the outreach and quality of existing food programs and to ensure increased buying power for our poorest citizens.

Task Forces

The eight task forces, representing citizens' action groups, expressed the same concerns as the voluntary action panels, in somewhat more detailed and forceful language. A statement was presented by five task forces at the closing plenary session. This involved five general recommendations:

1. Declaration of a national hunger and malnutrition emergency.
2. Provision of a guaranteed minimum income of $5,500 for a family of four.
3. Reform and expansion of present food programs until an adequate income becomes a reality.
4. A universal free breakfast and lunch program for all preschool and school age children.
5. Transfer of all nutrition-related programs from the U.S. Department of Agriculture to the Department of Health, Education, and Welfare.

These recommendations were passed, though only as an indication of general priorities, by a majority of those present at the session. Many of the delegates, while supporting the recommendations in principle, did not give unqualified endorsement. On the question of family assistance, most participants were not committed to a single target figure, unrelated to geography, work incentives and minimum wages.

Similarly, many were in favor of free school meals for needy children, but not for those who could afford to pay. The health task force, for example, and most professionals, were strongly in favor of conserving resources for the use of the poor.

General Trends

It is clear that the first steps in eliminating hunger and malnutrition are already available. One important priority is to find a system that provides money, or a substitute for money, or both. Recent action by the Department of Agriculture has started putting into operation a strong, viable food stamp program, until there can be an adequate maintenance system.

In expanding Federal food programs, the purchasing power of the poor will be substantially increased. In general, the idea of special foods for the poor was considered unsatisfactory. We felt that the best long-term way to help the poor is to help all Americans, by building improvements into the marketing structure and food supply for everyone. The poor, with help from Federal programs, would become, in effect, consumers. For the food industry, this represents an increase of around 10 percent in the potential market.

Another important conclusion from the Conference is that the best nutritional value for money needs to be provided. About one-third of the panels mentioned maintenance of food safety and nutritional standards, and informing the consumer about what he or she is buying.

In particular, industry, consumer representatives, nutritionists and government officials agreed on the need for more informative labeling, giving quantitative data on significant nutrients, such as ascorbic acid content of fruit juices, protein in sausages, etc. They urged the creating of a commission to work out an agreement on such labeling.

While nutrition education was recognized to be a vital key it was felt that the challenge was to find an effective system of communication that will be reflected in a person's food choices —in the restaurant or cafeteria line, the supermarket checkout, in the home— at a time when the nature of our food supply has been drastically altered through a shift from basic foods to processed foods, and to meals already prepared and frozen, or consumed outside the home.

Where Do We Go From Here?

A final report of the Conference has been presented to the President, and to the news media. The document itself will be generally available in the near future.

In the report, the recommendations of the panels are stated as they were presented. At the request of panel chairmen, there has been no editing or summarizing, and so sections of the report differ in style, manner of presentation, and of course, in recommendations made. Minority views are expressed in several instances. As a result, the document is a comprehensive compendium that can serve as a base for Federal Departments and agencies to develop effective policies and programs, with some feel for probable reaction by the public.

The President has passed the report on to the Food Subcommittee of the Urban Affairs Council. This consists of Secretary of Health, Education, and Welfare Finch, Secretary of Agriculture Hardin and Secretary of Commerce Stans. A small Interdepartmental Task Force is working on the recommendations and a meeting of the Urban Affairs Council is planned for the near future. I am certain this meeting will be the first step of many the Council will take.

FDA as regards composition and safety.
- A popular reference book on food safety, prepared jointly by experts and consumers.
- Modification of "trade secrets" that have potential hazard to consumers.
- Determination of consumer knowledge of food and nutrition.
- Food safety to be included in nutrition education programs.
- Mandatory fortification of certain basic foods.
- Food grading systems to include nutritional content; incorporation of "acceptability" in food quality standards.

IV Nutrition Education

- A dynamic and exciting nutrition education program from early childhood through school years.
- All programs to eliminate hunger and malnutrition to be reinforced with nutrition education.
- Appointment of a Coordinator of Nutrition Education; a supporting staff of nutrition and health educators, communications specialists; State and local coordinators for nutrition education programs.
- Projection of already successful nutrition education programs; criteria for evaluation of present curricula, teaching methods, resource materials.
- Consider parent and other forms of adult nutrition education in schools.
- Funds for curriculum development, resource materials, instructional aids, teacher training and school-community activities in nutrition.
- A comprehensive, sequential nutrition education program to be an integral part of every curriculum.
- A conceptual framework for design of new nutrition curricula, and to evaluate existing curricula.
- Nutrition units to be included in all courses for elementary teachers, school nurses, health educators, and teachers of other related areas.
- Continuing education on nutrition education techniques for teachers, supervisors, school health and food personnel.
- Development of additional nutrition curriculum materials and aids to reflect differing cultural patterns.
- A national nutrition manpower system; the primary role to be played by nutritionists and dietitians, supported by health aides and technicians; secondary roles to be played by personnel in other health professions.
- A massive recruitment effort for the nutrition professions from all groups of American society.
- More nutrition education for physicians, dentists, nurses and allied health personnel.
- Every health agency to have access to nutrition specialists, either as staff or consultants.
- Funding and support of efforts at community levels to reach all people with sound nutrition information; explore, test and evaluate new ways of getting the nutrition message to all people.
- Information for the public on available food and education programs.
- Color coding of foods according to nutrient content, readily identifiable by the consumer.
- Mobile Nutrition Units to provide nutrition education for communities; Food Fairs to include cooking demonstrations, movies and question sessions on nutrition; food selection games to develop wise food choices among players.
- A National Nutrition Education Media Center to be established to provide resources and training programs.
- A permanent Task Force of communications professionals, to be responsible for a bold, vigorous and effective mass media nutrition education program for all Americans.
- Enlist support of popular disk jockeys, sports figures, entertainers, etc. in spreading nutrition information; nutrition education to be incorporated in entertainment shows, e.g. soap operas.
- The popular nutrition education program to be identified with a copyrighted graphic symbol and slogan.
- Evaluation of the general application of the four food group concept.
- Require more public service time on radio and TV devoted to nutrition.
- Use of media, e.g. closed-circuit, open-dialog TV, for training neighborhood leaders.
- Short movies on nutrition for showing in neighborhood movie theaters.
- A national campaign by the Advertising Council to promote good nutrition (like *Keep America Beautiful).*
- "Time on the job" nutrition education for factory workers.
- Prizes and other recognition for successful nutrition programs.
- Avoidance of dullness, didacticism and condescension in all nutrition education.
- Strengthen enforcement of Federal laws protecting consumer from deceit and misinformation; greater penalties for false and misleading food advertising claims.
- An authoritative, unbiased source of guidance on current nutrition opinion.
- A Consumers' Federal Register to be published to explain, in lay language, government actions of interest to consumers.

V Food Distribution

- Use of food stamps to pay for school lunches until free lunches are universally available.
- Eliminate all State and local sales taxes on food.
- Review adequacy of USDA Low Cost Food Plan.
- Stronger economic and managerial assistance to food distributors in low-income inner city areas.
- Expand food distribution systems in rural areas.
- Continued development of new, low-cost, nutritious foods.
- Food manufacturers and retailers to accelerate programs of nutrition information and education.
- Special food tags to indicate high nutritional value relative to cost.
- Provision for families with marginal incomes to purchase food stamps or obtain commodities.
- The Civil Rights Act to be enforced against retail food outlets that discriminate by refusing to accept food stamps.
- Food cooperatives or mobile distribution units to assist remote or isolated areas.
- Development of party and snack foods, and foods for vending machines, that are nourishing and non-cariogenic.
- Information materials in various languages and cultural appeals to be developed on the general theme *The Family Life Cycle: Expectations, Variations and Anticipatory Guidance.*
- Encouragement of breast feeding.
- Mechanisms for prepaid family health care, in particular a national health insurance plan.
- Family welfare payments to be unconditional on employment of the mother.
- More part-time employment of mothers.
- Community level ombudsman service.
- A government-level policy-making body to be concerned with improving the quality of human life.

- Comprehensive health care services, including adequate nutrition services, to be made available to all children.
- Physical activity to be coordinated with nutrition programs to prevent obesity and promote physical fitness in school children.
- A "data bank" of what is known, and what needs to be known about nutritionally sound feeding practices for children of all ages, and from various cultural groups. Materials to be developed to advise parents on child feeding practices.
- The safety of monosodium glutamate for infants to be investigated; reduction of salt content of infant foods.
- Parents to be informed of patterns of child growth; periodic evaluation of growth by medical personnel.
- National Diet-Heart studies to investigate the possible relationship between diet, atherosclerosis and coronary heart disease.
- The food industry to be encouraged to label the fat and fatty acid content of foods that are major sources of dietary fat.
- An intensified public and professional education program on obesity, to combat misinformation and emphasize prevention.
- School lunch and breakfast programs to emphasize prevention of overweight in children.
- Expansion of FDA efforts to control unsound drug, dietary and reducing equipment treatment of obesity.
- A vigorous campaign to provide facts about hypertension; advise regular checks on blood pressure; an education program for physicians on current research findings and acceptable treatment.
- Hypertensive individuals, or those with a family history, to be advised to restrict salt intake; better labeling of salt content of foods.
- Increased physical exercise to be recommended for the public, educators and the medical profession.
- Increased facilities for physical activities, particularly in urban areas.
- Prospective studies of physical activity and coronary heart disease.
- Merger of functions of the National Heart Institute, the Heart Disease Control Program and the President's Council on Physical Fitness.
- Education of drinkers to compensate nutritionally for "empty calories" in alcoholic beverages; explore feasibility of fortifying alcoholic drinks with appropriate nutrients.
- Fluoridation of public water supplies.
- Investigation of cariostatic effects of enriching sugar and sugar products with phosphates and fluorides; development of natural and artificial sweetening agents other than sugar.
- More research on nutrition and periodontal health.
- Increased coordination between the dental and nutrition professions.
- Better methods to diagnose osteoporosis; early protective dietary management of osteoporosis.
- Nutritional analysis of foods consumed by various minority groups.
- New systems of food delivery whereby the aged can receive nutritious meals —through restaurants, institutions and private homes if necessary.
- Social Security benefits to be raised; reform of the public welfare system, to immediately increase the incomes of the elderly.
- Nutrition education programs aimed at the elderly, emphasizing physical activity and social interaction.
- Funds for training professional workers in geriatric nutrition.
- Continued research on the basic nature of aging.
- Nutrition services to be included in residential or home health care for the aged.
- All housing programs for the elderly to include good nutritional facilities, whether by meal service or individual cooking facilities.
- Special transportation for the elderly and other disadvantaged groups in order to take advantage of nutrition, health and other services.
- New, convenient, attractive foods to suit needs of elderly and all people.
- Clearer labeling, in visible print.
- Amendment of Federal Soil Bank Legislation to enable persons to raise food for personal consumption on soil bank land.
- Nutrition services to be a part of total health care.
- Trained *extended home care generalists* to link patient with health team.
- Services of a nutritionist to be reimbursable under Medicare, Medicaid.
- More emphasis on nutrition aspects of patient care; better use of dietitians as health team members.
- Standardization of commonly used modified diets.
- Computerized health information systems to include a nutrition profile of patients; a national data center on modern food composition.
- Expanded local nutrition and other related programs to be set up in Guam, Samoa, Trust Territories, Puerto Rico & Virgin Islands; for American Indians and Alaska natives.
- Stabilization of family cultural and economic life of migrant farm workers; expansion of the 1962 Migrant Health Act to provide nutrition services for all agricultural workers.
- Packaging of donated foods to be as attractive and informative as commercial foods.
- Expansion of commodity distribution outlets to include all facilities that presently serve the poor.
- Use of food stamps by the military poor at post exchanges.

III Provision of Food

- Regular monitoring of the nutritional adequacy of our food supply.
- Aggressive agricultural research to improve productivity, pest-resistance, nutritive value and consumer acceptance of foods.
- Expand iron fortification; consider calcium fortification of some foods; require iodization of all table salt.
- Protection of crops from pests and of people from pesticides.
- Substitutes for traditional foods to be required to have equivalent nutritive value.
- Research into fats and human health.
- Increase food fortification, including foods from varying ethnic, social, cultural and regional patterns.
- Accurate generic food names in addition to brand names.
- Informative labeling of food composition and nutritive qualities; standards of characterization of foods.
- Government standards for new foods to be enforceable by Federal, State and local authorities.
- Food additives to be permitted only if they are judged safe, according to the best available scientific procedures and if they have significant consumer benefit.
- Monitoring of the chemical content of food and its possible effect on health.
- Guidelines for fortification or enrichment of food to include minimum and maximum nutrient levels.
- Improved detection and reporting of food-borne diseases.
- Microbiological guidelines for high-risk foods; more effective food plant inspection; passage of a National Food Sanitation Act.
- Each new food to be precleared b

Continued on Pa

About the Author

Dr. Mayer

Jean Mayer is Professor of Nutrition, Harvard University School of Public Health, Boston. As Special Consultant to President Nixon, he organized and chaired the recent White House Conference on Food, Nutrition and Health.

His other current positions include Lecturer on the History of Public Health at Harvard, Member of the Center for Population Studies and Consultant in Nutrition to Boston Children's Hospital.

Dr. Mayer received his Ph.D. in physiological chemistry from Yale University, his D.Sc. in physiology from the Sorbonne in Paris, an honorary A.M. from Harvard and an honorary M.D. from Czechoslovakia.

Dr. Mayer has served on many United Nations committees on nutrition requirements, and on the editorial boards of a number of scientific publications. He has published extensively in the fields of nutrition, physiology and medicine; his research interests include obesity and hunger in animals and man.

Report from the White House Conference (Continued)

The President has said he does not want to see the recommendations of this Conference put on the shelf; he wants to see them acted upon. To emphasize his intention, the President has asked me to conduct a small conference in approximately one year, in order to evaluate implementation of the recommendations.

Conclusions

I believe that the White House Conference has made a great contribution in laying the groundwork for a national nutrition policy. Also, very importantly, it demonstrated that in a time of division and confrontation in our society, Americans from all walks of life can be brought together, and after spirited discussion, agree on common priorities.

Conservatives displayed compassion, liberals showed restraint and responsibility; the young worked with the middle-aged, the academics spoke intelligibly to the poor; the majority demonstrated a new concern for the minorities, the minorities saw the common interest. A real, moderate coalition emerged from the Conference with a strong desire to end hunger and malnutrition in America by the most effective and efficient means possible.

Editorial Note

The following pages are intended as a handy reference to some of the significant recommendations of the White House Conference. Many more recommendations were submitted than could be mentioned here. Also, some recommendations were made by more than one panel or section; these have only been listed once.

The majority of the panels, in making their recommendations, stressed that priority in time, efforts and resources should be directed first toward elimination of hunger and malnutrition among the poor.

For detailed consideration, readers are urged to obtain a full copy of the Report. The recommendations can then be studied together with the reasoning behind them, and with comments from the Task Forces that were assigned to the various panels.

The White House Conference was a guidepost to change; the Report contains guidelines for action. While many of the suggested changes require legislation or other official decisions, there are some recommendations that can be adopted and implemented in existing food and nutrition programs, right now.

I Nutritional Surveillance

- A total Federal system for coordinating food and nutrition monitoring.
- A permanent White House position of Special Assistant to the President for Nutrition.
- Nutrition policy coordination by the Department of Health, Education, and Welfare; establishment of a national Office of Nutrition within HEW.
- Establishment of Area Nutrition Centers under the Office of Nutrition to both monitor and service local needs.
- HEW to survey and monitor target, high-risk populations.
- Evaluation of Federally aided programs, and precedence to be given to strengthening programs that deliver health and nutrition services.
- USDA food consumption surveys to be broadened and coordinated with nutrition and health surveillance; strengthening of USDA's outreach to low-income families.
- The Office of Economic Opportunity to increase its emphasis on nutrition.
- State Governments and Legislatures to act on nutrition problems at the State and local level.
- An estimate of the state of the Nation's nutrition to be obtained.
- Improved methods of data collection, analysis and interpretation of dietary surveys.
- Modification (updating and upgrading) of survey methods when possible.
- Development of new methods to investigate nutrients for which little information exists (e.g. vitamin B_6).
- Priority to be given to solving problems uncovered by surveillance.
- Determination of "cut off points," where nutritional problems are of such magnitude as to call for remedial measures.
- More detailed and up-to-date information on the essential nutrient content of present-day foods.

II Vulnerable Groups

- Standards of unemployment compensation for women during pregnancy; job security to be safeguarded.
- All Federally supported programs in maternal and child health care to have an identifiable nutrition education component.
- Improved training of health professionals in aspects of maternal and infant nutrition.
- Continuation of education, health care, nutrition services and nutrition education for adolescent girls who become pregnant.
- Increased emphasis on health, nutrition and human reproduction in the curricula of young adolescents.
- Family planning services to be made available to adolescent girls.
- Major expansion of maternal and child health care facilities, manpower and programs.
- Improved personal, family and community services that affect adequate nutrition.
- Legislation to increase tax deductions for child care services.
- Investigation of optimum sodium intake during pregnancy and infancy.
- Guaranteed expansion of research efforts in maternal and child nutrition in relation to physical and mental growth and development.
- New and expanded day care facilities, with increased nutritional services; nutrition education via day care centers for children, parents, teachers, food service personnel.
- Limitation of sucrose-containing foods to preserve children's dental health; funds for comprehensive school dental programs; trials of new caries-prevention approaches.

- Increases in low-cost housing.
- Equality of education and opportunity for all Americans.
- Increase training programs to enable low-income people to qualify for higher paying jobs; recruitment and training of low-income people for jobs in current Federal food programs.
- Promotion of ghetto corporations, e.g. central school food services.
- Improvements in food stamp program: free food stamps for very poor families; money spent for food stamps to be proportional to income; inclusion of provision for special dietary needs; use of stamps for household items other than food.
- Phase-out of commodity distribution, replaced by food stamps, and preferably income maintenance.
- Uniform, simplified eligibility standards and certification procedures for all family assistance programs.
- Federal government to advertise its programs, actively seeking those eligible to participate.
- Find out how assistance programs affect food patterns, nutrition and well-being.
- School food programs to be an integral part of a comprehensive nutrition program for children and youth.
- A Children's Emergency Food Service to be launched for school children who are high nutrition risks.
- Development of school breakfast components of food programs.
- Coordinated efforts in nutrition counseling by school, physician and family, based on medical examinations and the child's individual need.
- Incentive grants for development of programs by schools to offer food at a reasonable cost to members of a community.
- Require submission of State plans for child nutrition programs.
- Efficiency measures in large-scale feeding systems could result in saving millions of dollars; these savings to be used for elimination of hunger and malnutrition, specifically preschool and school meal programs.
- Continuation of the Senate Select Committee on Nutrition.
- Combine all duplicated food service functions of separate Armed Services under one Department of Defense Food Service Command.
- Utilize expertise and facilities of Veterans Administration to train and assist those concerned with feeding children and senior citizens.
- In-prison food service training for rehabilitation of prisoners.
- Planning for use of school food service facilities in emergencies.
- Improvement of kitchens and other school food facilities; investigate leasing of modern equipment in schools.
- Use of national resources to finance child feeding, such as: continued use of Section 32 funds; royalties from NASA developments; sales of government land; Federal taxes on cigarettes, lotteries.
- A menu pattern system, specifying exact weights or measures of foods in various categories to replace Type "A" school lunch.
- School lunch to provide ⅓ of RDA at no cost to all *needy* children in 1970, to *all* children by 1975; half RDA to all *needy* children by 1975; all school-day nutritional needs at no cost to *all* children by 1980.
- Participation by the Food Service Industry in national programs to eliminate hunger and improve national nutrition, also to assist in nutrition education for schools, special groups and the eating-out public.

VI Voluntary Action to Help the Poor

- Accelerated research in increasing the protein level of grain products.
- Income for agricultural producers and other farm workers to be equal to other segments of the U.S. economy.
- Agricultural modernization to assist the deprived small farmer become more productive.
- Dry milling industry to convert to high-lysine corn for corn meal, grits and flour, especially in the Southwest.
- Repeal or amend various food laws that discourage development of new or improved foods, or additional fortification of existing foods.
- Voluntary enrichment of all milled rice.
- Fish protein concentrate to be permitted as an additive to manufactured foods, vitamin C to canned fruit and vegetable products.
- Nutritional enrichment of chocolate and other suitable snack foods.
- Industry to provide assistance to low-income business enterprises.
- Food industry to assist in community nutrition programs: training homemaker-aides; information booths in low-income area food stores; development of more consumer information materials.
- Nutrition education for supermarket employees.
- All food distributors to pledge to stock and promote use of enriched and fortified food products.
- Incentives to develop food stores in areas that lack modern facilities.
- Industry voluntarily to promote concept of a balanced diet, through use of uniform wording, symbols and graphic devices on packages and in advertising.
- Industry to initiate an information-educational program within the confines of today's laws, regulations and market conditions.
- Improved food packaging, e.g. more protection of nutritive value; reusable containers or other additional utility to consumer.
- Study adoption of metric system for food packaging.
- A National Nutrition Communications Council.
- A National Nutrition Alert Week to launch post-Conference efforts in eliminating hunger and malnutrition.
- A simple nutrition test to demonstrate to an individual how good his food habits are (perhaps a national TV network special).
- State Conferences on hunger and malnutrition to present first-hand reports of the Conference and to discuss its implications.
- Funds for continuation of the Conference Task Forces.
- Women's groups to help create public support for many of the suggested legislative changes.
- Food safety to be tested with respect to: 1) the individual food 2) the total diet and 3) in combination with pollutants (e.g. pesticides).
- Manufacturers to lower food costs by reducing expenditures for promotion.
- More consumer representation in nutrition policy-making bodies.
- Agencies to respond to the Conference recommendations via Federal Register, and state specific plans for implementation of them.
- Attention to be given to environmental sanitation to eliminate infection that contributes to malnutrition.
- Matching of State funds for school lunch programs with Federal funds.
- Formation of community centers for human services to coordinate existing nutrition and other services into an effective program.
- Each State to present organizational structure of food and nutrition action programs.

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The Role of Nutrition in the Course of Human Pregnancy

By Robert E. Shank, M.D.,
Danforth Professor and Head of the Department of Preventive Medicine, School of Medicine, Washington University, St. Louis, Missouri

Neonatal and infant mortality rates persist in the United States at levels much higher than those of other Western countries. They are a recent source of particular concern to health authorities. A rapidly growing United States population now calls for limitation of family size and adds urgency to the search for ways to assure best outcome of pregnancy for all mothers and infants.

An evaluation of the role of diet and nutritional factors was the assignment of the Committee on Maternal Nutrition of the National Research Council's Food and Nutrition Board. The Committee's findings, presented in the recently published report *Maternal Nutrition and the Course of Human Pregnancy** should be of value and interest to physicians, dietitians and other health professionals.

The report is an authoritative review of current knowledge of the effects of diet on the outcome of pregnancy. This article will digest some of its principle findings and recommendations.

*Available from the Publications Office, National Academy of Sciences-National Research Council, 2101 Constitution Ave., Washington, D.C. 20418. Price $7.50.

Current Status of Maternal Health

The maternal mortality rate is one index of reproductive performance and health care adequacy in which the U.S. has made remarkable advances in the past three decades. The rate has decreased from 367 maternal deaths per 100,000 live births in 1940 to 83.3 in 1950 and 28.0 in 1967.

This improvement is due mainly to the advent of antibiotic and other modern forms of treatment. Although little definitive evidence exists that improved nutritional practices have decreased the risk of pregnancy for the mother, it seems likely that better dietary management can further improve the outcome of pregnancy.

Maternal mortality rates vary inversely with per capita income and are more than three times as high in nonwhite as in white women. This difference is lessened in localities where white and nonwhite mothers of like economic status receive equally good maternity care.

Anemia is the most common complication of pregnancy, as the NRC report demonstrates. Usually, it is due to iron deficiency resulting from inadequate iron intake and/or blood loss. A relatively large increase in blood volume accompanies pregnancy, along with an increase in requirements for dietary iron and protein for synthesis of hemoglobin.

The total additional iron requirement for a single pregnancy is approximately 550 mg. It must be derived from iron stores in the body and from intake in food or supplements. Women in the U.S. ingest an average of about 12 mg of iron daily from food sources. Since no more than 10 to 20 percent of dietary iron is absorbed, it is unlikely that foods can supply the added iron requirements of pregnancy. Thus, routine supplementation with medicinal or ferrous iron salts in prenatal care is justified. Prescription of a daily supplement of 30 to 60 mg of iron during the second and third trimesters is recommended.

Although maternal deaths from toxemias of pregnancy have decreased from 52.2 per 100,000 live births in 1940 to 6.2 in 1965, this pregnancy complication is still a significant problem. Greatest risk is to women of low income.

The role of diet in the causation of toxemia has been widely debated. Calories, protein and salt all have been suspect. Frequently, prenatal diets limiting calories and/or salt are prescribed to reduce the risk of toxemia. *No justification is found for such routine salt or calorie limitations or for use of diuretics to limit weight gain and avoid edema.*

Current Status of Infant Health

Among the nations of the world, the United States ranks 13th in infant mortality. In 1967, this rate reached its lowest value—22.4 infant deaths per 1,000 live births. This rate is high, though, when contrasted with that of Sweden, which was only 12.6 per 1,000 live births in 1966. U.S. death rates are highest for infants born to youngest mothers and to nonwhite, low-income women.

Infants are at greatest risk when birth weight is less than 2,500 gms. Low birth-weight babies now account for 8.3 percent of all births and the proportion appears to be increasing.

Failure of an infant to thrive *in utero* has been linked with many factors. Among these are: biologic immaturity (mother 17 years of age or less), high parity, short stature, low pre-pregnancy weight for height, limited total weight gain in pregnancy, poor nutritional status, smoking, chronic disease, certain infections, complications of pregnancy, history of prior reproductive loss.

Assessment of the relative role of any single factor is difficult because many tend to occur in the same women. At particular disadvantage are women who are poor and from large families lacking good medical care, good diet and education. Poor nutrition and youth of the mother stand out as major causes of low birth weight and poor pregnancy outcome.

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Malnutrition During Pregnancy

Undernourishment of rats during pregnancy and/or lactation has been shown to result in growth retardation and permanent behavioral abnormalities in offspring. The present study, supported in part by National Dairy Council, was conducted to determine the effect of underfeeding mother rats on the learning ability and performance of the offspring. An elevated multiple T maze with or without a water reward was used in testing the pups. Offspring of underfed rats exhibited constantly recurring errors indicating a lack of efficient learning. Control rats manifested an ability to adapt to a new situation by "crossing over" when the water reward was removed but the experimental group did not. Results strongly indicate that maternal malnutrition causes the fetus to sustain behavioral abnormalities of long duration.

Simonson, M. and Chow, B. F. *Maze Studies on Progeny of Underfed Mother Rats,* J. Nutri. 100:685 (June) 1970.

Pregnancy in the Adolescent

With the aid of questionnaires, the nutritional status of 550 pregnant teen-agers and its relationship to obstetric and fetal outcome were evaluated during a two-year Texas survey. Upon admission into prenatal care, the calculated mean dietary intake met or exceeded National Research Council recommended allowances for protein, vitamin C, thiamin, riboflavin and niacin but not for calcium, iron and vitamin A. Hematologic data revealed a high prevalence of anemia. However, maternal and fetal complications were no more frequent than previously observed in the general obstetric population.

McGanity, W. J., Little, H. M., Fogelman, A., Jennings, L., Calhoun, E. and Dawson, E. B. *Pregnancy in the Adolescent. I. Preliminary Summary of Health Status,* Amer. J. Obs. Gyn. 103:773 (March) 1969.

Action on Serena Street

By Elizabeth Waggener, Consultant, Adult Basic Education, Improved Learning Unit, Colorado Department of Education

A high-priority "basic" of Adult Basic Education (ABE) is health information. The Colorado Department of Education has published a nutrition education unit for undereducated adults to disseminate sound information at a low grade-level of reading difficulty.

Action on Serena Street is a flexible, self-contained instructional packet on how nutrition affects the health of a family. Developed by a former staff member, Mrs. Virginia Banks, and Dr. Marelynn W. Zipser, nutritionist, it contains a story, a teacher's guide and set of visuals.

This packet is based on the authors' belief that acceptance of new nutritional concepts depends on recognition of tne strengths of existing dietary patterns. Materials are designed to meet varying adult needs and interests in a life-related learning experience centered on the student's personal concerns. The "action" on Serena Street is "the kind of action that changes the way people think about themselves."

Written in nontechnical language at first- to fourth-grade reading level, the 17-chapter story is printed in large type for reading ease. Each chapter narrates a phase of family life, providing natural division into discussion units.

Story characters are mother, father, five school-age children, a son back from the Job Corps and grandmother. As they confront the problems of daily living, they become familiar with and more accepting of community services and of new solutions to their problems.

The dramatic focal point, the grandmother's illness, diagnosed as classic mild diabetes, constitutes an introduction to major concepts: empty calories, balanced diet, the food groups, "complete" and "incomplete" proteins.

Other concepts incorporated into the story: dental health, the School Lunch Program, the Food Stamp Program, food shopping and storage.

While the story lends itself to exercises in various reading and computation skills, the real purpose of the fictional form is to provide a high-interest, fact-based story that learners can read for themselves.

Through identification with and class discussion of characters whose problems parallel their own, learners may more readily accept new solutions to real problems.

The ABE teacher seldom is a trained nutritionist, so a 52-page Teacher's Guide is provided as a nontechnical resource with bibliography. Each Guide unit relates to a specific element in the story and suggests lesson objectives, discussion topics, points to emphasize, demonstration techniques and class activities. Difficult or delicate points are given expanded treatment.

Flexibility is built in. A looseleaf format encourages the learner-centered instructional approach; material can be rearranged or supplemented according to student needs.

Perhaps the most dramatic visual aid in the packet is a set of plastic snaplock beads, color- and shape-coded to represent daily servings from the various food groups. A student can snap together a vivid representation of his daily intake. If the string of beads contains four purple beads, four green, six red and two yellow, he has the "Necklace of Good Eating" featured in the story. The beads can also be used to dramatize a number of other concepts.

Other materials included are a set of Dairy Council *Food Models* accompanied by flannelboard headings for food groups, graphic flyers and source information on films, filmstrips and slides.

Action on Serena Street is now used primarily in Colorado. In-service training and evaluation continue. After significant evaluation and revision, it is hoped the packet can be nationally distributed.

Traveling Nutrition Clinic

By John L. Cobb, Officer-in-Charge, Department of Agriculture, Food and Nutrition Service, Buffalo, New York, Field Office

Low-income families in 14 Municipal Housing Authority Projects in Buffalo, N.Y., received information via a traveling clinic organized by the Erie County, New York, Nutrition Committee. My staff assisted because we have federal responsibility for administration of the Food Stamp Program in Erie County.

The clinic's main objective was to inform residents of the Stamp Program, through which they might substantially increase their food purchasing power. Nutrition counseling was a supplementary objective.

In a time of rising food prices, increasing purchasing power is especially important. We knew many of the project's residents were senior citizens living on fixed incomes, such as social security and pensions. Inflation makes it increasingly difficult for them to make ends meet.

The committee was headed by Mrs. Ann Hershiser, Senior Home Economist with the Erie County Department of Social Services, with which we jointly operate the Food Stamp Program.

The team that visited each of the projects usually consisted of a volunteer home economist, a dietitian or nutritionist and a member of our office.

We explained the Stamp Program, and professional members of the teams counseled residents on nutrition, food buying, special diets, menu planning and food budgeting.

Materials on nutrition and consumer education, homemaking and Federal food assistance programs were provided by Federal, state and local agencies. They included our own leaflets and brochures on the Food Stamp Program, USDA's "How to Buy" series on fruit, vegetables, meat, poultry and dairy products, and *Food Guide for Older Folks.*

The Food and Drug Administration supplied materials on consumer protection and the New York State Health Department gave publications on home sanitation and proper refrigeration. Erie County provided its Food Stamp Program circular.

Plans were made to visit each project on its rent-paying day, when a maximum number of residents visit the project office. The central housing authority office and the project manager were contacted by letter six weeks before the planned visit.

A week later, the manager was visited to arrange for advance bulletin board notices and to determine the best locations for tables and displays to attract the maximum number of tenants. Clinic visits also received advance publicity in church bulletins in project neighborhoods.

Because most persons are reluctant to indicate whether they think they are eligible for the Stamp Program, tenants were advised to contact the Erie County Department of Social Services for information about being certified to receive stamps.

Since tenants were referred, it is difficult to assess, statistically, the success of the traveling clinic. At one project, however, we talked to 60 persons; 29 showed a genuine interest in the Stamp Program. After the clinic team's visit at another project, food stamp participation increased substantially. The Social Services Department will now have Food Stamp certification officers visit each of the 14 projects to assist their low-income tenants.

On the whole, we consider the visits were profitable. Through the committee's efforts, low-income families were provided with information that helps them to purchase more and better food.

Our main purpose was to disseminate information about the Food Stamp Program which, by increasing food purchasing power, may make a contribution toward the goal of eliminating hunger and malnutrition in America. But we hope readers may find other applications for the traveling clinic technique in their own nutrition education programs.

Energy Cost of Human Lactation

Existing evidence of the energy cost of lactation has mostly been collected under experimental conditions. Thus, the estimate that a lactating woman requires 1000 kcal daily in addition to ordinary requirements may not apply to lactating women under ordinary dietetic and social conditions. An investigation of 49 women living in Scotland was based on a survey of dietary intake, body weight changes, basal metabolism, energy output in breast milk and activity. It was calculated that an additional supply of 600 kcal daily should support lactation. This may be rounded to 500 kcal daily in official recommended allowances. The efficiency with which dietary energy was converted into energy in milk was about 90 percent, not 60 percent, as it was previously estimated.

Thomson, A. M., Hytten, F. E. and Billewicz, W. Z. *The Energy Cost of Human Lactation,* Brit. J. Nutr. 24:565 (June) 1970.

Iron Deficiency

Dietary surveys during the past two decades show girls and women usually consumed 10 to 12 mg iron/day, or approximately 60 percent of the current recommendation for females of childbearing age. Although iron deficiency is not the only cause of anemia, the most commonly used parameter for evaluating iron status is the presence or absence of anemia. Available data indicate a high prevalence of anemia in pregnant women, but this observation may be applicable only to those studied, since the prevalence of anemia in the total population of pregnant women is not known. Limited investigations suggest many nonanemic females are iron deficient, as evidenced by negligible iron stores. These observations demonstrate that standardized techniques and uniform methods of interpretation are essential if the extent of anemia in the general female population is to be determined with any accuracy.

White, H. S. *Iron Deficiency in Young Women,* Amer. J. Publ. Hlth. 60:659 (April) 1970.

The Role of Nutrition
Continued from Page 1

Pregnancy in Adolescence

More pregnancies are reported among adolescent girls living in the U.S. than for this age group in any other Western nation. In 1965 in the U.S., there were more than 196,000 live births to girls 17 years of age or younger. Average birth weight of these infants is substantially lower than that of infants born to older mothers; the proportion of low birth-weight babies is greater; and infant mortality rates are higher.

Greater risks of pregnancy for youngest mothers undoubtedly relate to the additional physiologic and psychologic stresses involved when pregnancy occurs before the mother's growth and maturation are fully achieved. Thus, it is particularly important to emphasize the greater nutritional demands of adolescent pregnancy. Such attention may greatly improve reproductive performance and maternal health in the United States.

Maternal Nutrition and the Course of Human Pregnancy calls for more careful attention to dietary management and nutritional preparation for pregnancy. It advocates abandonment of a number of widely accepted, current laissez-faire or potentially harmful practices. It notes the limitations of available information and points out specific research needs.

Specifically, the report recommends: 1) Use of the NRC Recommended Dietary Allowances, as adapted for pregnancy. 2) Encouragement of an average total weight gain of 24 pounds. 3) Routine use of iron supplements. 4) A gradual but progressive weight gain, monitored throughout pregnancy. 5) Caution in caloric restriction and limitation of weight gain as routine practices in prenatal care. 6) More attention focused on the pregnant adolescent and her greater need for adequate quantities of calories, protein, calcium and iron. 7) Prescription of salt restriction and diuretics only when medical justification can be given.

I hope many who read this article will read the report and be encouraged to aid in improving pregnancy performance in the United States through application of the nutritional principles it develops.

About the Author

Dr. Robert E. Shank

Dr. Shank is chairman of the Committee on Maternal Nutrition, Food and Nutrition Board, National Research Council.

Prior to his 1948 appointment as Professor of Preventive Medicine at Washington University, he was a research associate with the Public Health Research Institute of the City of New York. Dr. Shank received a B.S. degree from Westminster College (Missouri) and an M.D. degree from Washington University.

At the present time, Dr. Shank is a member of the Scientific Advisory Committee, Nutrition Foundation, New York City, and of the National Advisory Council of Child Health and Human Development, National Institute of Health. He has been a member and chairman of both the AMA Council on Foods and Nutrition and the Nutrition Study Section of NIH.

Current Events

Gerontological Society Meeting

The 23rd Annual Scientific Meeting of the Gerontological Society will be held at the Royal York Hotel, Toronto, Canada, October 22 to 24, 1970. The Society is devoted to research on aging.

A highlight of the program will be an interdisciplinary symposium on "Aging and Environment." Also planned are study groups for such areas as nutrition, rehabilitation and longitudinal studies.

Psychologists and sociologists will be introduced to recent advances in the biological aspects of aging at a colloquy to be held at a nearby university. A similiar program on psychological and social developments is planned for biologists and medical personnel.

Copies of the printed program are available from: Mrs. Marjorie Adler, Director of Publications, Gerontological Society, 1913 South Signal Hills, Kirkwood, Missouri 63122.

Worth Reading

The Cross-Cultural Approach to Health Behavior. Edited by L. Riddick Lynch. Cranbury, N.J.: Associated University Presses, Inc. $12.00.

Americans want to believe that "people are pretty much alike wherever you find them," according to anthropologist G. H. Fathauer of Miami University (Ohio). This tendency to disregard the cultural gulfs separating people may cause failures in intercultural health programs.

Cultural anthropologists recognize that patterns of behavior can be changed but insist that study of existing beliefs, not just good intention, is necessary to do the job.

The editor, a college health educator, helps to correlate the anthropologist's point of view with the knowledge and skill of health personnel in this compilation of reports of health-related anthropology research. Cultural groups studied represent the Americas, Asia, Africa and South Pacific islands.

The first of eight parts gives guidelines for applying anthropological perspectives to public health practices. Parts two through six consider ethnic groups indigenous to the areas represented. Primitive concepts of medicine, health and folk medicine are discussed in seven. A final article by Margaret Mead emphasizes the need for understanding one's own culture before attempting to influence people of another.

Food habits are examined specifically in articles by G. H. Fathauer; N. L. Solien Gonzalez, Ph.D., Associate Professor of Anthropology, University of New Mexico; and D. B. Jelliffe, M.D., Director, Caribbean Food and Nutrition Institute, Kingston, Jamaica.

As Dr. Fathauer points out: "If we wish to understand fully the dietary culture of any group, we must study . . . the meaning of each meal in the life of the people. The patterns of choosing, preparing, and consuming food must be fitted into the total pattern of the culture."

A significant conclusion to be drawn from the book is that many cultural differences exist in modern America and the need to consider them is as pressing as when one deals with a foreign society.

Nutrition News

DECEMBER 1970 VOL. 33, NO

Nutrition During Infancy and Early Childhood

By Virginia A. Beal,
Child Research Council,
Department of Pediatrics,
University of Colorado
School of Medicine

Nutrient requirements of the individual child depend on a host of factors unique to him. They vary not only with chronological age, but also with growth rate, maturational stage, physical activity, efficiency of absorption and utilization and other less well-defined factors.

Although use of a single standard of nutrient requirement for a given age and sex simplifies dietary evaluation of groups of children, it may be misleading when applied to an individual child. One cannot assume that a child is inadequately nourished if his intake falls below an arbitrary standard or even below a selected percentage of that standard. Nutrition requirements must be based on each child's personal makeup.

In the Child Research Council study of healthy middle-class children,[1] voluntary intakes varied widely. The maximum intakes of calories and protein, for example, were at least twice as high as the minimum intakes at a given age. The range was even greater for mineral and vitamin intakes. Comparison of caloric intakes from 1 to 10 years with the Recommended Dietary Allowance[2] showed that approximately 50 percent of the boys did not meet the Allowance.

After 3 years of age the girls in this series had lower intakes than boys, and by 6 to 10 years nearly 75 percent of the girls failed to meet the Allowance, and more than 10 percent had intakes less than two-thirds of the Allowance. Yet repeated physical examinations and measurements confirmed that they were healthy children with satisfactory gains in both height and weight.[1]

Individuality of Requirement

An example of individuality of requirement is that of two brothers who became relatively obese between 8 and 10 years of age. Their caloric intakes approximated the group median and were close to the Recommended Dietary Allowance for their age group. The boys' accelerated weight gains indicate that the median group intakes were excessive for these individuals.

In an analysis of data on 59 infants,[3] those whose first year iron intakes averaged 0.6 to 0.7 mg per kg per day had hemoglobin levels ranging from 9.7 to 14.3 gm per 100 ml at age 1. These levels were unrelated to growth rates. Highest hemoglobin concentration was 50 percent greater than the lowest on the same iron intake, indicating wide differences in efficiency of iron absorption and utilization.

Evaluation of nutritional status of the child should include not only dietary intake, but also an estimation of general health and present physical condition, activity, rate of growth and maturation, and biochemical determinations. A child who grows consistently at the 10th percentile and another at the 90th percentile may be equally healthy. However, their nutritional needs are different, just as the dietary requirements of a passive child differ from those of an active child.

The curve representing nutrient requirements by age tends to correspond to weight and height curves. In early infancy it rises rapidly but with decreasing acceleration. Weight gain, appetite and dietary intake are likely to be erratic in the preschool period. A slow, steady pattern of increase in size and nutritional needs is a tendency in early school years, leading to the spurt that usually characterizes adolescence.

Vulnerability of the Infant

We do not always appreciate the magnitude of growth in infancy. A baby's weight may triple in his first year, a rate that is secondary only to that of the intrauterine period and far exceeds the rate in adolescence. Thus, the infant is especially vulnerable to dietary inadequacies. Throughout the world the incidence of protein-calorie malnutrition or of iron-deficiency anemia is highest in late infancy and the early preschool period and then decreases, indicating a lessening of vulnerability as the rate of growth slows.

Because protein is essential to the formation of bone, muscle and other tissue components, and because foods high in protein are also high in minerals and vitamins, this nutrient assumes prime importance during the rapid growth of infancy.

In the first few months the needs of the healthy full-term infant can be met with breast or cow's milk and a supplement of vitamins C and D. With the depletion of his iron storage, probably at 3 to 5 months, he needs also a rich source of iron, such as fortified cereals.

The age when other semisolid foods are introduced tends to be based more on contemporary practice than on nutritional requirements. In the U.S. they are now commonly added at any age between 2 weeks and 3 months, with a wide variety reached by 6 months. Assuming the availability of appropriate foods, the appetite of the infant in the first year is usually a good index to his individual needs.

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Four issues annually: February, April, October, December

Maternal Deprivation Syndrome

In maternal deprivation syndrome failure of infants to grow has been attributed to psychological factors related to inadequate mothering. It is assumed that growth retardation occurs despite an adequate caloric intake. The validity of this assumption was tested in a study of 13 maternally deprived infants living in an environment which simulated their home environment. Eleven gained weight at an accelerated rate when fed adequately. The two who failed to gain had low food intakes. These data suggest maternally deprived infants are underweight because of undereating and not because of some psychologically induced effect in absorption or metabolism. The undereating is due to not being offered or not accepting adequate foods.

Whitten, C. F., Marvin, G. P. and Fischhoff, J. *Evidence that growth failure from maternal deprivation is secondary to undereating. J.Am.Med. Assn. 209:1675 (Sept. 15) 1969.*

Protein-Calorie Malnutrition

"Catch up" growth, which occurs when malnourished children are fed adequately, was recently studied in relation to food intake, efficiency of food utilization and changes in body composition. During recovery, growth rates were 15 times as fast as those of normal children of a similar age and five times as fast as those of normal children of a similar height or weight. Rapid growth was associated with high food intake. When the expected rate for height was reached, food intake fell abruptly by 30 percent and growth slowed down. Results indicate that the main factor which causes the falloff in weight gain once the expected weight for height has been reached is a voluntary reduction in food intake.

Ashworth, A. *Growth rates in children recovering from protein-calorie malnutrition. Br. J. Nutr. 23:835 (Nov.) 1969.*

Nutrition Education in the Supermarket

By Allene Burtis, Home Economist,
Hyde Park Cooperative Society, Chicago, Illinois

A full-time home economist-shopping consultant is an extra service of Hyde Park Co-Op Super Mart. My job might be described as consumer educator, and nutrition is a natural and principle subject.

If a shopper has questions about products or nutrition, the answer may be found at the Education Desk. Such questions as "Is there any food value in bean curd? Is it safe to refreeze meat? Is there an advantage to consuming large quantities of vitamin E?" are not rare.

Teaching grocery shoppers about nutrition—making it eye-catching and cart-stopping—is a challenge. "Lesson" content varies with topic, available materials and customer interests. A test kitchen-office located in the store makes maximum contact with customers possible.

Cooking demonstrations, store tours and talks to community groups are other avenues of communication, as are notes in the weekly "specials" flyer and a column in the monthly Co-Op newsletter, both of which are mailed to our 12,000 members.

More detailed information and recipes are mimeographed and distributed in the store. Displays are set up in windows, test kitchen, community coffee bar and near the checkout counter.

Nutrition is not a required subject for Co-Op customers, so information must be relevant to correct the notion that "All that talk applies to somebody else, not me." Educational presentations are based on customers' needs, social events, new scientific data and food promotions.

Personal contacts with customers reveal current questions and misconceptions which are used as a basis for newsletter articles. Similar feedback comes in letters from the store's Suggestion Box.

With the recent wave of consumerism, news media have awakened more widespread concern about foods, such as cyclamates, fat content of hot dogs and code dating of perishable food. When such situations arise, available information is gathered and printed to provide customers with the complete story.

Because Co-Op shoppers are already interested in thrift or seasonal foods, store specials and the USDA Plentiful Foods Program also are useful bases for nutrition education efforts. For example, during winter holidays practical cooking tips for turkey are given and its nutritional value is pointed out as well.

New products or foreign food fairs are other attention-getters. For example, our customers learned that bean curd is a healthful as well as tasty ingredient in oriental cooking.

National promotions such as Better Breakfast Month or Dairy Month offer excellent opportunities to emphasize nutrition themes. Display charts, advertising mats and posters from associations and food companies help to generate interest.

Is this in-store nutrition education program effective? Co-Op members and our management consider the home economist's contribution a worthwhile financial investment. The position has existed for 14 years, during which many people have utilized our services as a source for useful advice and information. The need for a home economist was recognized after volunteers initiated a recipe distribution system. Co-Op members realized a professional could provide additional information about nutrition, cooking and products sold in the store.

Should other grocery stores employ an in-store home economist? Is the public ready? If consumerism continues to increase and the food industry's current nutrition awareness campaign stimulates consumer demand for similar educational programs in food stores throughout the country, a home economist in the supermarket may become less unique.

Project Pro-Teen

By Mrs. Catherine Cox, Vocational Home Economist,
Frost Junior High School, Jackson, Michigan

Nutrition education may have more meaning for teen-agers if they have an opportunity to share their knowledge with younger children.

Project Pro-Teen was conceived, organized and carried out by 24 eighth grade girls in a home economics class at Frost Junior High School. Students chose the title over several others because of its dual meaning.

In the seventh grade, all the girls had completed a semester of Foods and Nutrition and a three-week unit on Child Development. So when curriculum ideas were presented and discussed with students during the first few weeks of the fall semester, a plan was devised to teach young children about food and good eating habits.

With consent of the Frost School Administration, the principal of nearby Helmer Elementary School was contacted and he arranged a meeting with two second grade teachers. After the teachers listened to the plan and offered suggestions, the teen-agers accepted the challenge of teaching second graders.

Transportation to and from Helmer was arranged through the Frost Parent-Teacher-Student organization. Eight mothers drove the teenagers to the elementary school twice a week for four months.

Each girl selected and studied a food topic, then submitted a plan for presenting a lesson about it. A typical lesson was one devoted to citrus fruits. Facts about oranges, for example, were pointed out: Why they are beneficial to health; where and when they grow; varieties; how to peel one (many children had not done this); forms of juice and how to store and reconstitute frozen juice concentrate. Other citrus fruits such as grapefruit, tangerines and kumquats also were discussed.

Class preparation time was approximately 52 minutes per day, five days a week. During this time, visual aids such as posters and give-away folders were prepared along with food samples.

The class was divided into six teams of four girls each. Two girls went to each of the second grade rooms on Tuesday and Thursday for two weeks. They alternated roles as "teacher" and "helper." Both cooperated in gathering supplies for each trip. The helper assisted with visuals and foods during the presentation and the children participated by helping to serve and tasting the food samples.

During presentation periods, which lasted about 30 minutes each, second grade teachers were free to offer suggestions and they also served as resource persons.

As each food was presented, the children discussed where it belonged within the four food groups. As part of the preparation for the project we had studied meal plans, so simple lunch and breakfast pattern meals were demonstrated; the children helped prepare and serve some of the foods.

After each visit to Helmer, we discussed and evaluated it during our class periods. A post-project evaluation by adults and eighth graders provided some goals for improving future projects of this type: 1) More time for elementary teachers to prepare their students for such a project; 2) More time for the student teachers to prepare lessons and practice presenting them; 3) Scheduling similar projects during the middle of the year to provide the time needed to realize the other two objectives.

Evaluations of Helmer teachers and the principal noted that the entire school had been interested in the project and that there was continued interest in foods and nutrition after the project had been completed. As one second grade teacher commented, "It is hard to put down on paper all of the (human) values that came from the program."

Ash Intake and Growth

Controversy continues to persist concerning the effect of electrolyte (ash) intake on weight gain of prematurely born infants. To help resolve the controversy, the growth rates of 29 premature infants were studied and the data published by authors holding conflicting viewpoints were reanalyzed. The infants were fed four isocaloric formulas differing in ash and protein content. Increasing the protein intake increased weight and length gain. But raising the ash content increased only the weight and this effect was limited to the neonatal period. Reanalyzed data of other workers give the same findings. Apparently, the increase in weight produced by ash is not true growth. Body length is suggested to be a better criterion of growth than weight.

Babson, S. G. and Bramhall, J. L. *Diet and growth in the premature infant. J. Pediatrics 74:890 (June) 1969.*

Food Intake of Infants

Recent changes in commercially prepared infant foods and increased availability of new products may be leading to changes in nutrient intake of infants. Adequacy of food intakes of 52 Honolulu infants attending well-baby clinics were determined from three-day food records. The children were three weeks to 10 months of age and from different ethnic groups. Except for iron, the nutrient intakes of most infants met at least two-thirds of the recommended allowances. The low iron intakes of many of the infants were probably due to failure to administer the prescribed dosage of iron supplements provided by the clinics.

Ho, C. H. and Brown, M. L. *Food intake of infants attending well-baby clinics in Honolulu. J. Amer. Diet. Assn. 57:17 (July) 1970.*

Appetite Deceleration

By the end of the first year, the child is undergoing rapid social and psychological development; is learning a language and a means of locomotion; and, in essence, is establishing his place in his world. His vigorous appetite is likely to decrease and food becomes less important to him. This is the "Johnnie won't eat" period of the preschooler.

In the Child Research Council series, approximately 95 percent of the children decreased milk intake toward the end of the first year or early in the second year. Most became fussy about cooked vegetables. Individual patterns of likes and dislikes became pronounced.

This period of poor appetite lasted only a few months for some children, but persisted to the age of 5 or 6 years for others. Except for brief periods of weight loss, there was little clinical evidence that the lower intakes of some nutrients were harmful at this age.

In a healthy child who is not subject to an excessive number of illnesses and does not have an extended weight loss, his indifferent appetite for food during this period seems not to be a matter for special concern. However, the type of foods offered should be of high nutritional value when appetite is limited.

The early school years may be considered "latent" nutritionally as well as psychologically. Intakes of the Child Research Council children rose slowly and rather steadily. They accepted a wider variety of foods. This pattern of eating, with relatively few problems, tended to continue until the transition into adolescence.

References

1. *McCammon, R.W. Human Growth and Development. Springfield, Ill.: Charles C. Thomas. 1970.*
2. *Recommended Dietary Allowances. Publ. No. 1694. Washington, D.C.: National Research Council. 1968.*
3. *Beal, V.A., Meyers, A.J. and McCammon, R.W. Iron intake, hemoglobin, and physical growth during the first two years of life. Pediatrics 30: 518, 1962.*

About the Author

Virginia A. Beal

Miss Beal began her association with the University of Colorado School of Medicine as a nutritionist with the Child Research Council. Before being named Assistant Clinical Professor of Pediatrics in 1959, she was on the staff of the school's Department for the Study of Human Growth, first as Instructor in Physiological Growth and later as Assistant Professor, Human Growth (Nutrition).

At Harvard School of Public Health Miss Beal was a nutritionist with the Department of Maternal and Child Health while earning an M.P.H. degree. She received her B.S. degree from Simmons College (Boston).

Miss Beal was a panel member of the 1969 White House Conference on Food, Nutrition and Health. She is affiliated with American Institute of Nutrition and American Dietetic and American Public Health Associations. Her honors include Delta Omega and listing in Who's Who of American Women and American Men of Science.

Current Events

1970 White House Conference on Children

An action-oriented, multidisciplined format sets the stage for the White House Conference on Children, which meets in Washington, D.C., December 13 to 18. Twenty-five forums, each led by a chairman and a vice-chairman selected for their expertise in one of a wide range of disciplines, will guide working sessions for 4000 delegates.

Studies and proposals will be grouped in the broad areas of individuality, learning, health, parents and families, communities and environments, and laws, rights and responsibilities.

The 1970 Conference will focus on the general objective "to enhance and cherish the individuality and identity of each child through the recognition and encouragement of his or her own development, regardless of environmental conditions or circumstance of birth."

Worth Reading

Food to Nurture the Mind. By Bruno Bettelheim, Ph.D. The Children's Foundation, 1026 Seventeenth Street, N.W., Washington, D.C. 20036. 1970. $1.00.

". . . Food given by the school without due regard to the child's self-respect poisons his relation to school and learning." That nutrition *per se* should not be the sole objective of school lunch administrators was the theme of the above titled talk by Dr. Bettelheim. He believes that the way school lunch is now offered may be as detrimental to a child's development as insufficient nutrients.

To begin, there are poor physical conditions in many school lunch programs. Long lines. Limited time for eating. Makeshift cafeterias serving double or triple duty as gymnasiums and auditoriums. Inadequate kitchens. And noise.

Even if lunch program surroundings are pleasant, the noted child psychologist considers lunch too often only an adjunct to the learning process.

He illustrates: "A non-reader finally learned to read after he had been hand fed by his teacher for weeks when he asked her, 'Feed me,' when he meant 'Read to me.' Without recognizing it he knew that we have not only to teach but to feed the whole child, feed food to his body as we feed knowledge to his mind."

If teachers saw the importance of the teacher-learner feeding relationship, Dr. Bettelheim believes they might spend time feeding children or eating the same food in the same room with them, or "even make doing so a central point in their relation to them."

Ideally, school days might be built around breakfast, lunch and snacks eaten in small groups with a teacher who not only educates minds but also nurtures total personalities.

In Dr. Bettelheim's estimation, money spent on such a program would pay off better than practically any other educational expenditure.

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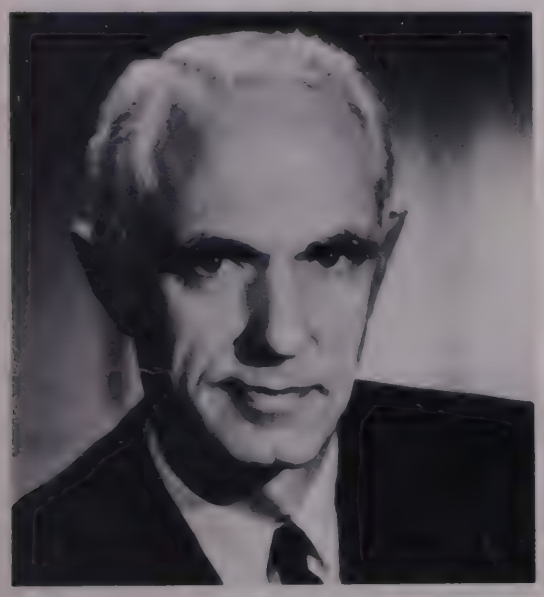
Nutrition and The Aging



By John B. Martin,
U.S. Commissioner on Aging and
Special Assistant to the
President for the Aging

"You are what you eat" proclaims a hip art poster. To the young, this statement may have nuances of meaning unknown to me; meanings with which I could not agree. But, I find in it the valid message that nutrition greatly affects our physical health and sense of well-being.

A diet providing recommended amounts of essential nutrients can sustain good health and may prevent, or slow, the onset of certain diseases and degenerative conditions associated with aging. If the young learn this and develop good eating habits now, we may not need to worry about "nutrition and aging" 40 years hence.

Today's older Americans did not acquire sound nutritional knowledge as youth, when their eating habits were forming, because their childhood was also the childhood of the science of nutrition.

It is not surprising, then, that the elderly often do not have or take full advantage of nutritional knowledge. They may be aware that proper diet helps prolong good health and vigor, but be vague about what constitutes an adequate diet. Many have difficulty discerning reliable from fraudulent nutrition information and are vulnerable to nutritional quackery. Thus, older people probably are represented disproportionately among the estimated 10 million persons who spend millions of dollars a year on unneeded dietary products.

Lack of knowledge and money probably are the major reasons malnutrition is so common among the aged. Foods older people most need often are costly to buy—foods rich in protein, minerals and vitamins. Limited incomes must stretch to cover other essentials such as rent or taxes. In making choices, many do without food or buy any inexpensive food that staves off hunger, nutritionally adequate or not.

Other less tangible though no less real barriers to proper nutrition among the elderly are loneliness, alienation, apathy. Five million older Americans live alone. For many, the effort of obtaining and preparing food to eat alone does not seem worthwhile. Earlier in their lives, meals were social occasions, times for friendship, companionship and exchange of information . . . the traditional time for the family to come together. Family and friends gone, meals become solitary affairs, with zest and motivation also lost.

Projects and Programs

The Administration on Aging supports a number of research and demonstration programs on improving nutrition for older people. A majority of these provide meals in group settings. Giving older persons an opportunity to combine friendship and social activity with nourishing meals is found to improve not only physical appearance and health, but happiness, activity and mental outlook as well.

New Food Stamp Amendments

We also are interested in programs providing home delivery of meals to frail, homebound elderly. New Food Stamp amendments, signed into law this January by President Nixon, will for the first time permit older persons eligible for food stamps to use them for food prepared and delivered by a political subdivision or a private, nonprofit "meals on wheels" program.

Previously, food stamps could be used only to buy basic, unprepared foods. Difficulties in transportation, shopping and preparation of food have made them of little value to homebound persons. We hope food stamps eventually may be used by eligible ambulatory persons to purchase meals in group settings. Early inclusion of nutrition programs is among the basic social services we anticipate communities will provide needy residents. We are working to this end with other agencies of the Social and Rehabilitation Service, particularly the Community Services Administration.

Gerontology—*A scientific study of the phenomena of aging and of the problems (including social problems) of the aged.*

Geriatrics—*A branch of medicine dealing with the problems and diseases of old age and aging people.*

"The aging"—*When the Administration on Aging (AOA) refers to "the aging" or to "older Americans" it means men and women 65 and over. There are at present nearly 20 million such Americans. This calendar "cut off" has been dictated largely because it is the age when Social Security benefits begin and often is the mandatory retirement age in private business.* **Medically, it signifies nothing about health or abilities, since all individuals age differently.**

Administration on Aging—*AOA was established in the Department of Health, Education, and Welfare by the Older Americans Act of 1965. Providing a Federal focus on concerns of older people, AOA acts for inclusion of their interests in all Federal programs and administers several grant programs. These include a state program (Title III of the Act) operated through a state agency on aging in every state and U.S. territory.*

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Four issues annually: February, April, October, December

Folic Acid and Vitamin B_{12}

To determine circumstances influencing levels of folic acid and vitamin B_{12} in the serum, two groups of elderly patients and one of younger healthy subjects were studied. Very low levels of serum folate were found in each group; two geriatric patients had anemia due to folate deficiency. No significant correlation was found between sex, age, vitamin B_{12} levels and folate levels in the three groups. Poor intake of folate-containing foods, such as milk, fresh fruit and vegetables, and the use of certain drugs previously have been shown to reduce serum folate levels.

The older groups had higher serum levels of vitamin B_{12} than the younger group. Probably the higher levels are abnormal and may reflect the increasing practice of administering vitamin B_{12} to elderly patients.

Meindok, H. and Dvorsky, R. *Serum folate and vitamin B_{12} levels in the elderly*. J. Am. Geriatrics Soc. 18:317 (April) 1970.

Vitamin C Deficiency

Multiple bruises in the elderly often are ascribed to a fall or to trauma caused by restlessness. Bruises observed in elderly patients in this study, however, all were attributable to a vitamin C deficiency. Upon treatment with ascorbic acid, all signs of vitamin C deficiency including anemia and intense tenderness of the tibia cleared up quickly. Simultaneous occurrence of vitamin C and folic acid deficiencies in one patient may be more than coincidental since vitamin C is essential in the conversion of folic acid to its active form. Thorough clinical examination for elderly patients is essential, for unrecognized nutritional deficiencies can defeat patient rehabilitation efforts.

Mitra, M. L. *Vitamin C deficiency in the elderly and its manifestations*. J. Am. Geriatrics Soc. 18:67 (Jan.) 1970.

Chicago Serves Meals to 'Golden Diners'

By Mrs. Jeanette Martin, Public Health Nutritionist,
Chicago Nutrition Program for Older Adults, Chicago, Illinois

"Enjoy a good meal with good friends in the Golden Diners Club." This theme attracts the elderly for 2500 meals a week in Chicago's Nutrition Program for Older Adults.

Begun in June 1968, the program is designed to provide well-balanced meals at low cost and to combat isolation for senior citizens. Participants pay for meals according to their income.

Operated by the Division for Senior Citizens, Chicago Department of Human Resources, it is one of 31 research and demonstration programs in nutrition for senior citizens sponsored by the U.S. Department of Health, Education, and Welfare.

Under funding by Title IV of the Older Americans Act, costs are shared by the local operator. The city has underwritten 50 percent of the project costs during the third and final year of operation.

Five primary objectives of the program are:

[to improve nutritional and general well-being of aged Chicagoans

[to test distribution techniques

[to strengthen and expand existing social and educational services for older persons

[to provide employment and volunteer opportunities for the aged

[to secure research information on social and dietary habits of elderly people, applicable locally, regionally and nationally.

Other goals include providing opportunity for socializing and educational programming along with a daily hot meal and supportive services requested by participants; obtaining data on the nutritional status of Chicago's elderly; determining the effectiveness of coordinated sponsorship by community agencies; and observing the types of relationships developed among senior citizens as they share meals.

Menus are planned to meet the nutritional requirements of older persons. Though most often served at noon, a full "dinner" is provided. Ethnic preferences are considered.

A number of food service plans have been tested, including one in which participants prepared the food. Most economical, efficient and flexible was the use of a large catering service, which delivers hot food in bulk containers to serve from a portable steam table.

Three educational approaches have been used: (1) lectures on the importance of good food habits in old age; (2) demonstrations and talks on easily prepared meals for one or two; (3) a program newsletter, *The Golden Voice*, published bimonthly. It contains the plentiful foods list, easy menus, shopping and housekeeping hints, news from program sites. All programming is designed to stress the importance of food to physical and mental well-being.

Thirty-five locations have been tried and, if workable, used for the Golden Diners Club. Sites include apartment buildings for low-income elderly, settlement houses, neighborhood centers, churches and a restaurant.

Staffs of these cooperating agencies help to set up programs, make evaluations and distribute promotional material. A senior citizen, called a nutrition aide, is employed at each meal site to supervise food service and handle paper work.

The experimental program has involved the services of five resource agencies — the Milk Foundation, Cook County Department of Public Aid Bureau of Home Economics, Food Stamp Program, Armour and Company, Chicago Department of Consumer Sales, Weights and Measures.

Evaluation is underway at local and national levels, but complete findings are not expected until after the program ends in June 1971. Those of us involved in its implementation hope the findings will result in improved ways of assisting the elderly with consumer and nutrition problems.

Nutrition Aids Indian Journey to Today

By Mrs. Levina S. Phillips, R.D.,
Dade County Department of Public Health, Miami, Florida

The Forty Mile Bend Reservation, 40 miles west of Miami on the Tamiami Trail, often is called the "postage stamp" reservation. Five and one-half miles long and 500 feet wide, it is the home of the Miccosukee Indians. Driven there from Alabama in the 1720's by encroaching white settlers, the Miccosukees comprise about two-thirds of the 1300 Seminoles (a combination tribe) in Florida today.

Living on this isolated reservation, illiteracy and a language barrier have left the Miccosukees in yesteryear. They exist by selling handmade dolls, colorful clothing, and by operating their family camps as tourist attractions.

Many live in *chickees* like those of their ancestors. A cypress log chickee, open on all sides and topped with palm fronds, has a platform 3 feet above ground where the family lives and sleeps. A family camp consists of several chickees built around a primitive cooking shelter with an open fire. Until recent years, some had electricity but none had running water.

In 1963, the Miccosukees finally started their "journey to today" by requesting Federal government assistance. To determine health needs, Dade County Department of Public Health conducted a special screening program at the reservation. Most Miccosukees were found to need medical and/or dental attention. Intestinal parasites, dental caries and obesity were widespread. Hemoglobin counts of women and children were extremely low.

The Miccosukee diet, customarily eaten in two meals a day, was mainly fried foods—fish, corn, sweet potatoes, grits, squash, pumpkin, root vegetables similar to taro and fried or boiled meat. Innumerable soft drinks were consumed. Most foods were bought at stores in town.

Aided by an interpreter, we developed nutrition programs based on action, involvement of the population and the theme "Food is fun." These "do and share" programs are presented once monthly with follow-up by village school teachers.

Our first goal was to increase the variety of foods eaten, while stressing sanitation. School students preferred a watery starch drink, *sofkee*, to milk. Aided by the Dairy Council of South Florida, we introduced milk by making homemade ice cream. Later, students visited a dairy farm and a processing plant. Though sofkee still is a favorite snack, it now is alternated with milk drinks. Milk is well accepted at lunch.

A cooking school for Miccosukee women resulted from their desire to make pies. Pies brought a need for picture recipes which became a tool for teaching reading. We now have advanced to a simplified cookbook.

A professional food demonstrator sparked interest in salads among women and students. Villagers asked for second servings of salad when we "went social" with a community dinner after also studying entrees.

The Miccosukee one-room school has been replaced with a modern community center. Program participants plan and prepare their own nourishing lunches. They now eat a greater variety of foods. Weight control classes are under way.

Twenty-five families have houses with modern kitchens, including safe running water and electric stoves. English is established as a second language, so an interpreter rarely is needed.

On the whole, home food consumption habits have not changed markedly. The Miccosukee custom of eating two meals a day continues, but has been modified to include breakfast for school children.

Change never is instant, but these proud people have come so far, so fast. Good nutrition now is an expression of love and fun, a means to achieve better health and a vital link in the Miccosukees' journey into today.

Pernicious Anemia and Cancer

This study contradicts earlier reports that persons with pernicious anemia have a greater chance of developing cancer of the stomach than the general population. Because of previous reports, this study originally was aimed at gathering data on diagnostic signs which might lead to early detection of stomach cancer. A group of 138 patients with pernicious anemia, whose mean age was 74 years, was followed for an average of about 11 years. Each patient's medical history was critically reviewed. Then all subjects underwent periodic radiographic and gastroscopic examinations. None of the patients had cancer during the long follow-up, suggesting that no real relationship exists between this disease and pernicious anemia.

Hoffman, N. R. *The relationship between pernicious anemia and cancer of the stomach*. Geriatrics 25:90 (April) 1970.

Physiology of Aging

Data from a longitudinal study of some 700 males, aged 20 to 96 years, have provided some indications of what happens during aging. Certain physiologic functions remain quite stable over the entire life span. For example, blood glucose levels during fasting do not change significantly with age, and blood volume and red cell content remain remarkably constant. But other physiologic characteristics show a decrement with age. Basal metabolic rate decreases by about 20 percent. Renal blood flow and maximum breathing capacity fall about 50 percent over a span of 30 to 90 years. In addition, ability to adjust to physiologic stresses decreases with aging. Evidence exists that loss of reserve capacities with advancing age is due partly to gradual loss of functioning cells in the body.

Shock, N. W. *Physiologic aspects of aging*. J. Am. Diet. Assn. 56:491 (June) 1970.

Questions and Issues

Nutrition problems often arise when an older person must be placed in an institution. Can he be expected to adjust to strange foods prepared in strange ways? Conversely, can institutions serving persons of diverse ethnic, religious and cultural backgrounds accommodate these differences?

If, through research, we can identify specific nutritional deficiencies most common among the elderly, what measures should be taken to overcome them? Is more widespread food fortification an answer? Will more informative food labeling help?

The White House Conference on Aging, to be held in November 1971, will consider these issues and options for resolving them. From this Conference, we hope, a national policy toward the aged will emerge. It is expected to include specific, practical recommendations to meet the nutritional needs of older Americans. Pie-in-the-sky proposals are unacceptable; pie in the sky will not feed the malnourished.

Much of the homework for the Conference on Aging is being done now in communities across the U.S. Participants from all levels of government, service professions and organizations, business and industry, science and the arts, and the elderly themselves, are looking at the issues. They are considering historical background as well as current knowledge, technology and available resources.

We have asked them to identify gaps in our knowledge, to recommend measures to fill them, to suggest priorities for use of limited resources and to recommend a balancing of efforts among Federal, state and local governments, other institutions and individuals.

Panels considering nutrition issues have been asked to look at the total environment affecting older people. Where there are overlapping issues, such as the impact of inadequate home cooking and storage facilities or inadequate transportation for shopping, we have put the same issues before task forces and experts in housing and transportation. Programs and resources allotted to meet the needs of the elderly must be interrelated, as are the problems.

Poverty is a critical plight of millions of older people. Low income is the overriding reason why many older persons do not get enough of the foods they need. However, we do not assume that higher incomes alone will assure nutritional adequacy among the aged. As indicated, men and women must be motivated to prepare food and to eat properly.

What more must be done? What additional measures . . . in education, housing, health care, transportation and human relationships . . . in available food and food service systems . . . are necessary to meet the problems?

By focusing national attention on conditions of today's elderly, the White House Conference is expected to generate support for positive programs to make the later years worth living. To do this, the elderly should not be placed in competition with other groups, but be *included* in all aspects of national life. When all Americans can see old age as a continuation of life — an extension of their own early and middle years — the not-yet-aged citizens will identify with and support policies which give dignity and purpose to the later years.

About the Author

John B. Martin

Appointed by President Nixon in 1969 as U.S. Commissioner on Aging and later that year as Special Assistant to the President for the Aging, Mr. Martin has been active in the field for a number of years.

Previously, he served as vice-chairman and chairman of Michigan's Commission on Aging and was a member of the National Planning Advisory Committee for the White House Conference on the Aging held in January 1961. In 1959-1960, he was chairman of the Grand Rapids, Michigan, Coordinating Council on Aging.

Commissioner Martin received an A.B. degree from Dartmouth, a B. Litt. degree as a Rhodes Scholar at Oxford and a J.D. degree from University of Michigan Law School.

Worth Reading

Nutrition and Aging: A Monograph for Practitioners. By S. C. Howell and M. B. Loeb. Gerontological Society, 660 South Euclid, St. Louis, Missouri. 1969. $3.00.

A valuable tool for those working with older adults, this monograph incorporates current information relevant to nutrition from diverse fields, including medical science, social service, home management, psychobiology, anthropology and psychology.

A preamble to Part I of two parts, called "A Plea Against Generalizing," identifies eight issues (later elaborated) intended to "suggest to the practitioner the problems of sampling into moments of lifetimes. . ."

Research pertinent to geriatric nutrition is reviewed in the eight chapters of Part I. Statistics from and interpretation of surveys on income, age and food consumption are given, as is a comprehensive review of nutritional needs of the aged. Factors influencing dietary practices, such as adult stress, the nervous system, chronic disease, family structure, socialization, culture, myths and food preferences of the aged are discussed. The major topic of Chapter Eight (Age and the Learning of New Behaviors: Changing Dietary Habits) is the practical application of learning theory to nutrition work with older adults.

Part II identifies major areas of current food service programming and specifies their varied objectives. Trends are examined. Suggestions for improvement or expansion of current programs and initiation of new ones are made. Chapters on program evaluation and community organization are included to indicate special consideration practitioners should give these subjects.

Appendix A suggests research and demonstration needs in nutrition and aging, categorized into four areas: economics and consumer education; clinical medicine and physiology; social and behavioral sciences; and program planning and evaluation. Measuring instruments for practitioners' use and source data comprise Appendix B.

Nutrition News
OCTOBER 1971 VOL. 34, NO.
SPECIAL ISSUE: BEHAVIOR PATTERNS AND CORONARY RISK

Observations on the Pathogenesis of Coronary Heart Disease

By Ray H. Rosenman, M.D. and Meyer Friedman, M.D., Harold Brunn Institute, Mount Zion Hospital and Medical Center, San Francisco

Societal characteristics and other selected factors are being studied to try to assess which, if any, may correlate significantly with the increased incidence of clinical coronary heart disease (CHD). Epidemiological studies show that the incidence of CHD is considerably higher in populations characterized by enriched diets, inadequate physical activity and modern industrialization.

Before 1920, recorded occurrence of clinical CHD in the U.S. and England, for example, was rare even in the same type of populations that exhibit a high incidence of it today. Nevertheless, large numbers of individuals in these earlier populations ingested enriched diets and had a similar lack of physical activity; the chief difference for them was the relative absence of modern man's industrialized way of life.[1]

Epidemiological studies also show that in contemporary Western societies exhibiting high coronary morbidity, the rate of occurrence of CHD is higher in groups of men who are overweight; heavy cigarette smokers; have diastolic hypertension, diabetes, increased blood levels of triglycerides, cholesterol and/or beta lipoproteins; or have parental CHD history. However, evidence regarding these risk factors appears to be inconclusive in fully explaining the observed higher incidence of CHD morbidity in such groups, in view of data obtained in long-range prospective studies.[2,3]

Ray H. Rosenman, M.D.

In a prospective study, researchers follow the population after initial studies are made. Most prospective studies of coronary heart disease exclude from follow-up all but the initially healthy individuals. The characteristics having possible relevance to future development of CHD are studied at intake with the hope of differentiating those characteristics associated with the future development of CHD among subjects studied. Data from such prospective studies showed that:

- ☐ Most of the men who exhibited the classic risk factors nevertheless did not develop clinical CHD
- ☐ A substantial number of men who developed CHD did not exhibit the risk factors. [2,3,4]

Role of Diet Questioned

Close scrutiny reveals a rather poor correlation between national diets and rates of CHD.[5] Glaring exceptions are some African tribes and groups of monks who ingest high fat diets yet exhibit low coronary morbidity.[6] Furthermore, the striking increase in CHD in industrialized societies in the past four or five decades has occurred without any real change of diet or serum lipid levels and too rapidly to be attributed to changes in biological inheritance.[7]

Data from prospective studies of CHD victims compared to those remaining free of CHD showed no differences of habitual diet or habits of physical activity. Also, in such populations there was no correlation between dietary fat intake and serum cholesterol levels. [8,9,10]

Meyer Friedman, M.D.

Despite higher *rates* of coronary morbidity in individuals in industrialized areas when compared to individuals in more primitive societies with diets low in all triglycerides and cholesterol, greater physical activity and lower serum lipids, the *degree* to which atherosclerosis develops in the aorta is quite similar.[11] This strongly suggests that the known higher rate of incidence of coronary atherosclerosis in the industrialized societies is not just a consequence of increased intimal filtration of dietary fat.

Other Factors Suspected

Consideration of the findings of our own studies and those of others led us to conclude that neither diet, serum lipids nor any other "classic culprit" was the single cause of our increasing rate of coronary morbidity.

It was clear, too, that most epidemiological studies had failed to assess the influence of socioeconomic and behavioral stresses among groups under investigation. This was particularly surprising because a good correlation could be obtained between the presence of certain socioeconomic stresses and the incidence of CHD.

Continued on Page 10

Stress—A Possible Risk Factor

About 15 years ago we suspected that the rising coronary rate in middle-aged American males might stem from some emotional interaction between new stresses imposed by our industrialized society and the "known" risk factors.

Our suspicion was strengthened by the observation that groups free of such socioeconomic stresses were free of coronary heart disease regardless of their dietary, smoking or exercise habits, and that younger victims of coronary heart disease frequently exhibited a particular type of personality structure.

Accordingly, in 1960 we began a long-term epidemiological investigation of 3500 well men aged 39 to 59 years.[12] These men were employed in 11 organizations participating in the Western Collaborative Group Study.

Study Reveals Surprising Data

Of the 3169 initially well men who remained in the study (i.e., men with no history, electrocardiographic or other clinical evidence of CHD), 257 developed clinical coronary heart disease in the first 8½ years of our study. Surprisingly, a review of records showed that annual examinations had determined these facts about the 257 CHD victims:

- ☐ Hypertension was absent in 77 percent
- ☐ Diastolic blood pressure exceeded 100 mm Hg in only 19 percent
- ☐ Serum cholesterol level was less than 260 mg/100 ml in 62 percent
- ☐ Both serum cholesterol and blood pressure were normal in half and both were abnormal in only 10 percent
- ☐ Almost half were non-smokers or smoked fewer than 16 cigarettes daily.

Evaluation of these data led us to conclude that neither diet, serum lipids nor any other recognized risk factor was essentially responsible for the increase in coronary morbidity observed during the past few decades in industrialized societies.

Modern Life Presents New Stresses

Stress probably has always been an integral part of life, but modern industrialization presents stresses uniquely new—different from those in other groups and older civilizations. Primitive man was and still is concerned with food and survival. Industrialized man faces the competition of diverse psychological, sociological and economic pressures. Industrialized society is increasingly concerned with time and speed, nurtured by every form of mechanization.

Increased knowledge and productivity seem to have failed to provide us with increased intelligence, moral discipline, improved nervous equilibrium or serenity. Possibly the rapidly changing environment and new threats to homeostasis may have exceeded man's evolutionary adaptability.

Perhaps an increasing number of humans resort to primitive reactions of withdrawal and flight. But what of those who adapt to the environment with an aggressive and ambitious competitiveness, the "doers," who seek advancement and recognition as well as survival?

Behavior Pattern Characteristics

Based on observations made during our long-term study, we have termed as Behavior Pattern Type A the personality structure we first noted 15 years ago as frequently being exhibited by younger coronary heart disease victims.

Behavior Pattern Type A primarily is characterized by personality traits such as aggressiveness, ambition, drive, competitiveness and a profound sense of time urgency. Locomotion and mannerisms are rapid. Speech usually is forceful, fast, often explosively uneven and emphatic, and is accompanied by sudden gestures such as fist-clenching and taut facial grimaces.

Men with Behavior Pattern Type A appear excessively and willingly driven to achievement; to "getting things

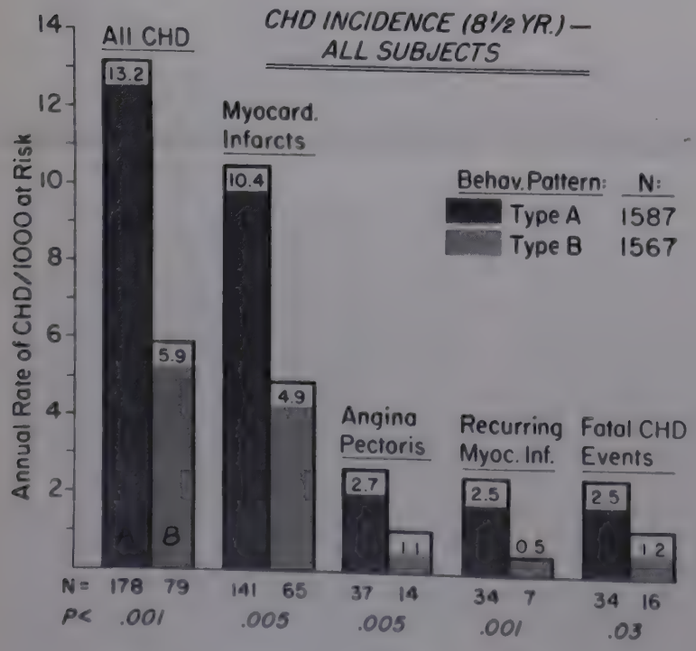


Figure 1

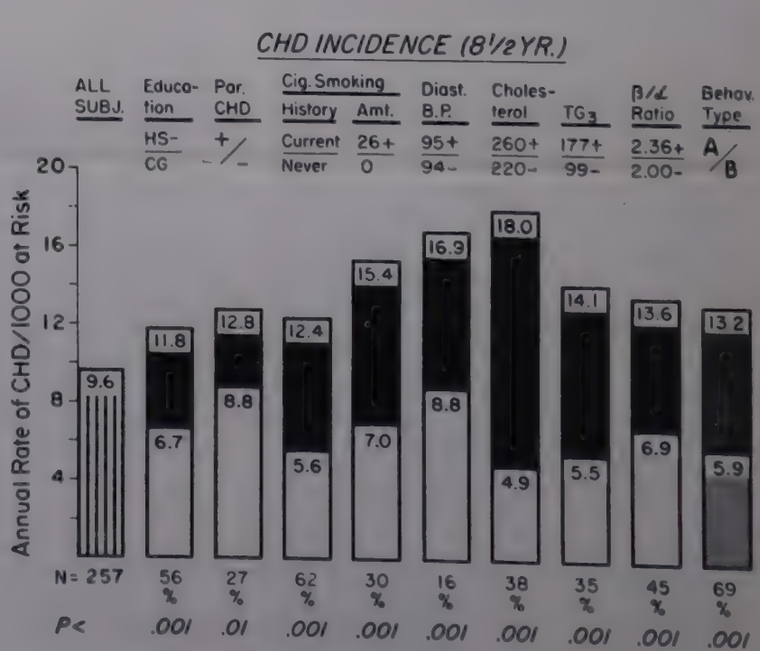


Figure 2

Learning Nutrition By Doing

By Robert Carrier, Fourth-Fifth Grade Teacher
Eurekadale Elementary School, Taylor, Michigan

Because many children come to school with little or no breakfast and have poorly balanced daily diets, educators in various fields recognize the need to teach nutrition values. Most educators realize too that humans perceive data and form concepts in many ways, through various media, and at differing rates of speed. They also generally agree that students learn best by *doing*.

To help my fourth-fifth graders develop good dietary health values, I planned techniques for conveying such important nutrition concepts as: 1) The human body needs different kinds of foods to be healthy; 2) Different foods aid body growth and development in different ways; 3) Certain foods have much nutritional value, while others have little or none; 4) An adequate daily diet is important.

All the methods I used to teach the importance of a balanced daily diet required the students to *do*, instead of just to listen or to read.

As a lead-in to planning a meal, students listed what they ate for breakfast one morning. Results were tabulated and placed on the chalkboard.

The class then was divided into small groups and given research assignments: Ascertain the four basic food groups; determine the elements of which food is made; learn how the body uses food daily from each of the food groups; and so on. The Dairy Council booklet *How Your Body Uses Food* was a useful tool for this assignment. We discussed the information collected and related it to the breakfast items listed on the board. Students began to evaluate their own diets.

Next we planned, prepared and served a breakfast. The class was divided into four sections, each supplying food from one food group. Eating a complete, adequate breakfast was uncommon for many of the children. The class was *doing* what it previously had studied and discussed. Students also learned about meal planning, place settings, table conversation and clean-up responsibilities.

Guest Speaker Inspires Drawings

Dr. Stephen Baynai, a dentist, came to our school to discuss tooth decay, preventive dental care and the importance of an adequate diet in tooth development. As a result of his visit, the students drew pictures of different characters (some depicted toothy monsters and Dracula types) who neglected their teeth. Dr. Baynai was humorously appreciative of the masterpieces and displayed them in his office for several months.

Other Tools Facilitate Learning

My avocation is composing songs and creating games which are both educational and entertaining. For the nutrition unit, I composed a song which asks, "What does a mother cow, mother cat, mother dog, etc., give to her young that your mother gives to you?" Milk, of course, is the answer.

Two games that I developed teach the story of dairy foods. One is a card game, played like "Old Maid," and the other is a board game which traces the paths of milk, butter, cheese and ice cream from the cow to their purchase by the consumer.

If nutrition concepts were learned by students, and their behavior was changed, it is unlikely that any single learning experience was responsible. Probably each tool or device played a part in the process. It was evident that activities requiring student involvement, the *doing* activities, generated the most interest, excitement, motivation and, it seems probable, the most change in behavior. This confirms our class motto:

I hear—I forget
I see—I remember
I do—I understand

Nutrition in Action. Third Edition.
By Ethel Austin Martin.
New York: Holt, Rinehart and Winston, Inc. 1971. $9.95

This edition, as the previous two, is directed toward college students majoring in fields other than nutrition, such as elementary education, health and physical education and social service. It is also suitable for refresher courses and workshops.

While primary focus is on nutrition principles, the broad scope of the subject is delineated. This edition presents a fresh appearance and is almost completely rewritten:

Length—New topics are included and others amplified for an increase from 298 to 406 pages.

Organization—Fifteen chapters, four new, now comprise four parts: "Nutrition Begins with Food," "The Science of Nutrition," "Applying the Science of Nutrition," "Nutrition in Action Around the World."

Subject Matter—Most tables and figures are new or updated; 1968 Recommended Dietary Allowances (RDA) are used and food composition data are based largely on 1970 U.S. Department of Agriculture figures. Recent research is covered by inclusive references and suggestions for further reading. The number of tables included is doubled. Five additional appendixes consider height-weight interpretation and ethnic diets. Stronger emphasis is placed on such subjects as severe malnutrition and mental development, international nutrition problems, nutrition education, the National Nutrition Survey and teenage pregnancies. Conversion from kilocalories to kilojoules is discussed.

Design—New cover design and binding update and enhance the book's appearance. Graphic representations of the RDA now facilitate quick visual comparisons of the varied nutritional needs throughout the life cycle and under special health conditions.

The author, a nutrition education authority, has increased the scope in this edition of a text intended to fulfill a vital goal: Generating appreciation of the importance of adequate nutrition in professional persons outside the field of nutrition.

No matter how the data are stratified, the findings indicate that *Behavior Pattern Type A men are subject to significantly higher coronary morbidity than Type B men.*[3,4] In addition, we have found that Type A men exhibit underlying coronary atherosclerosis to a significantly greater degree.[16]

If Behavior Pattern Type A relates to the origin and development of coronary heart disease, then prospective studies should find that Pattern A persons exhibit biological characteristics generally found in men who already have coronary heart disease.

In a series of studies completed during the past decade, we have found that Pattern A is indeed associated with biological phenomena characteristic of individuals with coronary heart disease: more rapid blood coagulation;[14,15] elevated blood levels of serum cholesterol, triglycerides, lipoproteins;[14,15,16,17] delayed clearance of an ingested test fat (either saturated or unsaturated) meal;[18] and augmented daytime excretion of norepinephrine.[19] In addition, as described earlier, it is evident that Pattern A is pathogenetic, at least partly, in other than these recognized ways.

Look Beyond Previous Concepts

It is understandably difficult for many persons to accept a concept that the central nervous system may cause permanent structural changes as well as transient cardiovascular changes that play an adaptive role in homeostasis. However, mounting evidence indicates that the Behavior Pattern we have designated as Type A plays a major role in accelerating atherogenesis and the onset of clinical coronary heart disease.[20,21,22]

Epidemiological correlations do *not* establish factual cause and effect relationships between "known" risk factors and coronary heart disease. In light of this evidence, it appears increasingly important for clinicians and researchers to extend their therapeutic and prophylactic concepts beyond lipid metabolism and other presently "recognized" risk factors.

Future studies must consider the relationship between the central nervous system and associated environmental stresses and its possible role in the pathogenesis of coronary heart disease.

The Western Collaborative Group Study was supported by National In-

Continued on Page 14

Review of Heart Disease Studies

A critical review was made of studies reporting low rates of ischemic heart disease in certain population groups throughout the world. Methodological and circumstantial limitations prohibited equivalent comparisons between studies, but it was hoped that examining these studies together might provide inferences about characteristics common to "low risk" groups. The review yielded a striking finding: A majority of the studies had concentrated attention only on dietary patterns and serum lipids and had not considered the other risk factors commonly thought of as important in the development of ischemic heart disease. The prevalence of diabetes and hypertension, smoking habits, degree of physical activity and social and psychological factors were rarely reported. Therefore, one cannot conclude that those risk factors which were studied explain the low rates of ischemic heart disease.

Bruhn, J. G. and Wolf, S. Studies reporting "low rates" of ischemic heart disease: a critical review. Am. J. Pub. Health. 60:1477 (Aug.) 1970.

Cholesterol and Atherosclerosis

A study was made of 605 Jewish residents of homes for the aged, 70 years of age or older, who had lived in the same environment for several years. Subjects were grouped according to diagnoses of their health condition. Some had atherosclerotic disease, others did not. Serum cholesterol concentration was found to be unrelated to clinically evident atherosclerosis in these elderly persons.

Schadel, M., Harth, A. and Zeltzer, M. Clinical manifestations of atherosclerosis and serum cholesterol levels in aged. Geriatrics 26:172 (May) 1971.

Diet and Heart Disease

In a speech presented at the Royal College of Physicians of London, Dr. Donald S. Fredrickson, Director of Intramural Research, (U.S.) National Heart and Lung Institute, discussed the report of the Intersociety Commission for Heart Disease Resources. The Commission was originally created by the American Heart Association to survey the United States' resources for treating circulatory diseases.

He stated that the Commission's goal of preventing circulatory diseases is praiseworthy and will have unanimous support, but noted that some of its dietary recommendations cannot withstand critical appraisal in the light of current scientific information. For example, "What evidence do we have that an egg yolk a day spells jeopardy for *all* Americans?" More information is needed about the occurrence of certain disorders such as incipient diabetes before the general population is advised to eat a diet providing more than half of the calories as carbohydrates. Moreover, Dr. Fredrickson questioned the safety of recommending a diet containing as much as 10 percent polyunsaturated fatty acids, especially for infants.

Conclusive Proof Lacking

Because conclusive proof of the value of dietary change to the entire population is lacking, he suggested it would be more appropriate to focus attention on those individuals in the population who are most susceptible to coronary heart disease. For the majority of these individuals, treatment usually involves not diet alone but a combination of diet and drug therapy. However, whether treatment of blood lipid disorders has a favorable effect on the course of coronary artery disease remains to be established.

After considering these priorities concerning diet and ischemic heart disease, Dr. Fredrickson concluded that more studies are needed before so radical a dietary change is recommended to the entire population.

Fredrickson, D.S. Mutants, hyperlipoproteinaemia and coronary artery disease. Brit. Med. J. 2:187 (April) 1971.

Figure 3

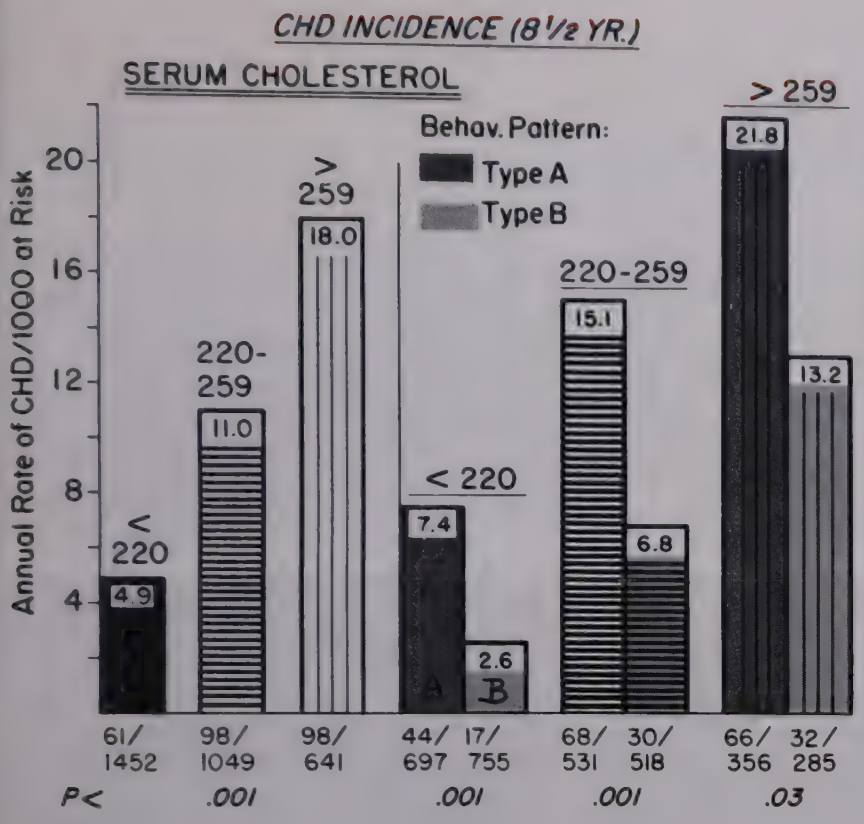
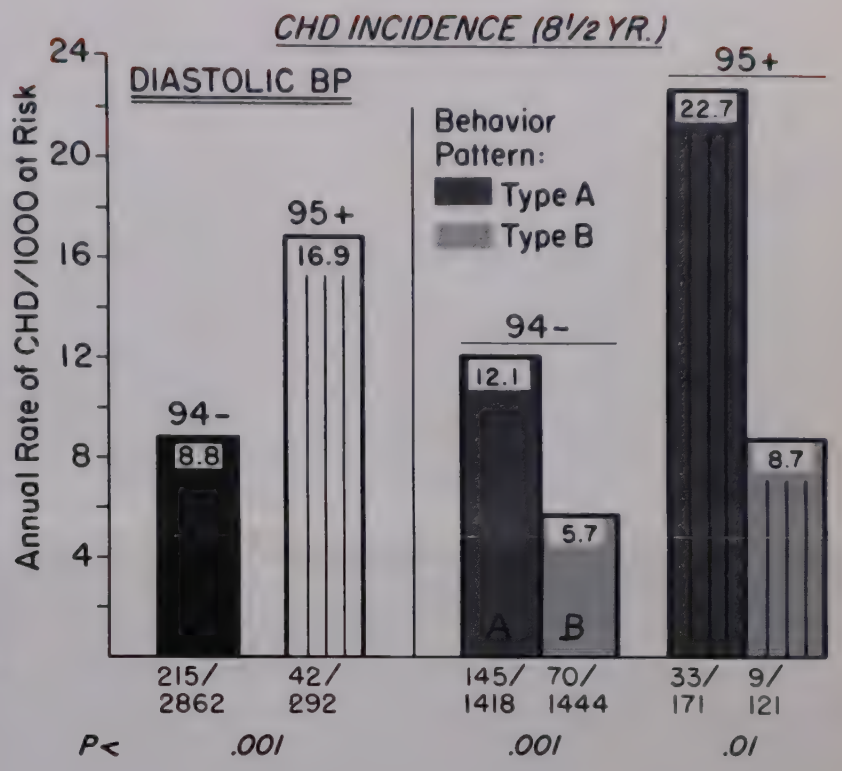


Figure 4



done." Simultaneously, they are unable to overcome the inflexibility of time or the competing and obstructing effects of other persons and things. They appear to be living habitually under time pressure.

Behavior Pattern Type A, then, is an interaction of certain personality and modern environmental factors, and it is probably increasingly prevalent. Men exhibiting Behavior Pattern Type A often seem content with their multiple commitments, even though these impose deadlines which may increase the individual's sense of time urgency. This Behavior Pattern should not be confused with such emotional responses as simple nervous anxiety or "garden variety" of neuroses.

Behavior Pattern Type B has also been characterized. No sharp cleavage exists between the two Patterns. Rather, the individual with Behavior Pattern Type A exhibits *to an excessive degree* traits also present, but to a lesser degree, in individuals with Behavior Pattern Type B.

Findings Link Pattern A and CHD

In surveying younger coronary patients, we were impressed that they could be distinguished by their exhibition of Behavior Pattern Type A characteristics far more than by their heredity, blood pressure, blood lipid levels or by their habits of diet, exercise or smoking.

We considered it important to determine the results of imposing acute time urgency on a group of accountants by means of a situational work deadline involving income tax. When this stimulus was applied, a significant rise in blood cholesterol and acceleration of blood clotting almost invariably occurred. *These clinical findings could not be ascribed to alterations of diet, weight or exercise.*[13]

These observations indicated need for another study, one of groups of men and women who were *habitually* subjected to deadlines and who habitually exhibited Behavior Pattern Type A. Individuals of both sexes with Behavior Pattern Type A had higher blood cholesterol levels, more rapid blood clotting and much higher prevalence of coronary heart disease than their Type B counterparts. *These differences could not be attributed to differences in diet, smoking, weight or exercise habits between the two groups.*[14,15]

Although these findings indicated that Behavior Pattern Type A hastened the onset of clinical coronary heart disease, additional study was needed to evaluate whether Behavior Pattern Type A preceded or resulted from the presence of CHD. The 257 men who developed CHD during our prospective study provided one indication: 70 percent, or 178, of them had been classified as displaying the Type A Behavior Pattern at the time the study was initiated in 1960 (Fig. 1).

Statistical Analyses Confirm Link

The incidence of new CHD was increased in men exhibiting all of the classic risk factors (Fig. 2). These risk factors accelerate the development of CHD when superimposed on either Behavior Pattern Type A or Type B but particularly in Type A individuals. Statistical analyses of the data revealed, however, that Behavior Pattern Type A was an *independent* risk factor associated with increased incidence of CHD.[3,4]

Thus, Behavior Pattern Type A, as compared to Type B, is directly related to coronary heart disease, irrespective of the classic risk factors.

According to our findings, then, Behavior Pattern Type A is pathogenetic —or a risk factor—in itself. In other words, whether or not a Pattern A man smokes, he is more likely to develop coronary heart disease than is a Pattern B man. This is also true of a Pattern A man regardless of his serum cholesterol level (Fig. 3), serum triglyceride and beta lipoprotein levels, diastolic blood pressure (Fig. 4), parental history or any combination of risk factors.

Continued on Page 12

stitutes of Health, Research Grant HE-03429, and a grant from the Irwin Strasburger Memorial Medical Foundation of New York.

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His memberships include the New York Academy of Science, California Academy of Medicine, American Society for Clinical Investigation and Western Association of Physicians. He is a Fellow of the American College of Cardiology and the American Heart Association Councils on Epidemiology, Arteriosclerosis, and High Blood Pressure. In the latter organization, he is on the Medical Advisory Board. He is a member of the Council on Epidemiology and Prevention, International Society of Cardiology.

Meyer Friedman, M.D.

Dr. Friedman has been Director of the Harold Brunn Institute for Cardiovascular Research since 1939 and Associate Chief of Medicine, Mount Zion Hospital and Medical Center since 1948. He holds an A.B. degree from Yale University, an M.D. degree from Johns Hopkins Medical School, and American Boards' Specialty Certificates in Internal Medicine and Cardiovascular Disease. His postgraduate training included residency in cardiovascular research at Michael Reese Hospital, Chicago.

Dr. Friedman is a Fellow of the American Heart Association Councils on Clinical Cardiology, Arteriosclerosis, Basic Science, and Circulation, and is a member of that organization's Foundation for High Blood Pressure Research. Among many other affiliations are memberships in the American Medical Association, American Physiological Society, American Society for Clinical Investigation, and the Society for Experimental Biology and Medicine.

Nutrition News

DECEMBER 1971 VOL. 34, NO

Nutrition, Mental Development and Behavior

By David A. Levitsky, Ph.D.
Assistant Professor, Graduate School of Nutrition, Cornell University

Much of the increased interest in the nutrition-behavior relationship in the past 15 years is a result of research observations that malnutrition (especially protein-calorie malnutrition) suffered early in life may result in mental retardation. Evidence has substantiated the conclusions from the classic study by Geber and Dean[1] that young children hospitalized for protein malnutrition display significantly slower rates of psychomotor and cognitive development than their well-fed controls.

Although less conclusive, data from studies of older children showing good evidence of earlier malnutrition strongly suggest that lag in mental development lingers after nutritional and medical rehabilitation.

Human malnutrition is almost invariably accompanied by poor health care, poor educational facilities, inadequate housing, social discrimination and other harmful factors associated with poverty. Thus, it is difficult to conclude from most studies of human malnutrition that delays in cognitive development are due solely to nutritional factors. Recent investigators have studied experimental animals under laboratory conditions to obtain more definitive answers.

Animal studies appear to confirm human studies. They indicate that prenatal or postnatal protein-calorie malnutrition significantly delays development of basic neuromotor responses such as eye opening; standing; righting and startle reflexes; and significantly retards development of various electroencephalic responses such as visual cortical evoked potential. However, neuromotor development does not always predict ultimate developmental levels.

Almost all animal malnutrition researchers have studied possible learning process damage. Prenatally or postnatally malnourished rats display poorer learning performance than their well-fed controls. However, it is very difficult to conclude that these performance decrements were due to decreased ability to learn. Problem-solving performance, only a reflection of the unobservable learning process, may be affected by other variables. In fact, when other performance factors were carefully controlled, no difference in learning performance has been observed.

A tendency to be hyperemotional has been observed in malnourished young rats, pigs and monkeys, and significantly, nutritional rehabilitation does not appear to reverse such behavior. The presence of food or aversive stimulation, such as loud noise or mild shock, produces excessive responses. For example, when offered food following 23 hours without it, these animals become hyperexcited and spill much of their food.

A recent experiment by Zimmerman *et al*[2] demonstrates how this emotional difference may interfere with learning performance. Young Rhesus monkeys, malnourished from the age of one month by a low-protein diet, were tested in a standard discrimination situation. When fully adapted to all test elements, they performed as well as their well-nourished controls. However, when testing elements were unfamiliar, the performance of the malnourished monkeys was markedly disrupted. Although the learning process itself was not affected, negative reactions to novel stimuli interfered with test performance.

A notable behavioral characteristic of children hospitalized for malnutrition is abnormal apathy. Such children display indifference to their surroundings and a high degree of irritability. Similarly, early malnutrition of rats, monkeys and pigs decreases their normal tendency to explore. In rats, this behavior appears to continue long after nutritional rehabilitation.

Physiological Correlates

Severe protein malnutrition profoundly alters almost all body components including the brain. Most obvious is a physical retardation of tissue growth. Analysis shows that malnutrition: retards cell multiplication, as reflected by decreased deoxyribonucleic acid (DNA) content; slows brain lipid development, which probably reflects brain myelin content; decreases the amount of dendritic arboration. Functionally, total brain norepinephrine content decreases and brain cholinesterase concentration increases.

Following adequate nutritional rehabilitation, DNA and lipid content appear to be permanently depressed. Norepinephrine content appears to return to normal, but brain cholinesterase concentration remains elevated.

The relationship of brain DNA and brain lipids to behavior is relatively obscure, but the central cholinergic (neurons containing acetylcholine) system is intricately involved, although its exact role is controversial. For example, various drugs which affect central cholinergic transmission interfere with memory and thought processes, and stressful environmental events such as electroconvulsive shock increase brain cholinesterase level. Even though these changes *correlate* with observed behavioral abnormalities, *causational* statements cannot be made at this time.

Environmental Interactions

Implicit in much research on malnutrition and behavior is the notion of irreversible "brain damage," or brain structure changes which would preclude organism development. However, developmental distur-

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Symposium: Nutrition, Growth and Mental Development. American Journal of Diseases of Children 120:5 (Nov.) 1970.

This symposium, part of the 1970 American Pediatric Society Annual Meeting, covered possible *effects* induced by exposure to nutritional risk and *mechanisms* which may underlie those effects.

"Introductory Remarks," Dr. Herbert G. Birch, Bronx, N.Y. Contrary to concepts of the brain as an insulated system, data increasingly indicate that this organ requires nutritional support as other organs do. It is especially vulnerable at certain times since its final cell population is reached early in life.

The argument that heredity and/or environment rather than nutrition are responsible for intellectual deficiencies is being explored. Sibship control studies have shown an association between intellectual variation of siblings and individual nutritional experiences. Examination of features of neurologic maturation which underlie general cognitive competences, and which are relatively uninfluenced by individual cultural experiences, shows that children subject to nutritional risk at pertinent ages are later defective in significant aspects of behavioral competence.

"The Evaluation of Human Growth Patterns," Dr. Angus M. Thomson, Newcastle upon Tyne, England. Despite uncertain details, it seems established that impaired somatic growth may be common and that severe or prolonged growth interruptions may have permanent effects. Critical periods appear to be the final phases of gestation, six months to two years of age and adolescence. Evidence reveals that retarded somatic growth is statistically associated with impaired neurological and intellectual development, but this should be interpreted cautiously.

"Mental Performance in School Age Children: Findings After Recovery From Early Severe Malnutrition," Dr. Joaquin Cravioto, Mexico City, Mexico. Children hospitalized for early severe malnutrition were compared with closest-in-age siblings to control familial and social circumstances. Results of four studies testing basic learning mechanisms and intelligence

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Parent-Child Education

By Mrs. Barbara S. Rice, Assistant Professor and Extension Home Economist, University of Wisconsin, Milwaukee

"All that learning for free. I wish everybody could have this experience . . ." "I had fun; I thought because it was called Parent-Child we would get to know our children better, but there was more to it. . ."

These quotes indicate participants' reactions to the Parent-Child Education (PCE) program sponsored by the Milwaukee County Department of Public Welfare and University of Wisconsin Extension Office.

PCE is for disadvantaged mothers and their 2- to 4-year-old children. It was designed to increase parental skills, self-motivation, self-confidence and understanding of child development. While care is provided for preschoolers, mothers interested in employment in child care centers, school lunch programs or in-home family day care gain practical work experience.

Participants are referred by welfare caseworkers. A trained volunteer then interviews each mother in her home concerning knowledge and skills in home management, food and nutrition, and parent-child relationships. This information is used to adapt the basic curriculum to participants' needs. Each mother receives a $53 monthly stipend for expenses.

The eight-week program is repeated five times a year, with 20 mothers enrolled each time. Sessions are from 9 a.m. to 3 p.m. daily. For morning programming, the adult group is divided in half. While 10 mothers participate in home management sessions, the others are involved in day care planning and operation, including a practice center attended by the PCE children. After four weeks, curricula are traded.

In the afternoon, while children nap or play, all 20 mothers are involved in a variety of activities. Two afternoons are devoted to budget and record-keeping techniques and use of credit. Each woman records her spending during the two-month period. Records are analyzed and individual spending plans are developed.

Afternoon sessions also include: Eight in which each mother makes a child's play outfit; eight on emergency home nursing, led by a Red Cross instructor; four on making play articles from common household materials; two on sex education for children and family planning, presented by the Planned Parenthood Association; self-medication, taught by an Extension pharmacist; introduction to representatives of community child care and school lunch programs; and field trips.

The learning environment is carefully planned to stimulate development of student self-direction. Initially, a structured, supportive atmosphere is established to build rapport and confidence. Gradual fading of the instructor's direction encourages the mothers to undertake and manage the program. They ultimately plan, prepare and serve nutritionally balanced lunches for the entire group of 20 mothers and approximately 24 children. They also learn to plan lessons and activities and to teach skills to the preschoolers in an informal, encouraging manner.

Participants are encouraged to set personal goals. A vocational guidance counselor discusses job availability, General Education Diploma courses and advanced training programs with each mother. An individual plan of future action helps motivate the mother to continue growing toward self-support.

Interviews with mothers three months after they complete the program indicate that PCE influences them to seek training leading to self-support and to improve their home environments and performance of the parental role. Mental and physical development of the preschool children is enhanced, along with the knowledge, attitudes and skills of their mothers in home management, food and nutrition, and child development.

Worth Reading
Continued from Page 16

"Shape Your Future"

By Mrs. Marie S. Hindman, Extension Specialist-Nutrition
Clemson University, Clemson, South Carolina

The "Shape Your Future" program was developed to assist South Carolina youths to enhance appearance and personality through improved diet and exercise. Since many teen-agers are interested in weight control, the program also emphasizes the dangers of fad diets. "Shape Your Future" can be adapted to many situations, but its primary message is always that food plays a big part in shaping one's future.

The program guide, a series of lesson plans, is easy to use. State Agricultural Extension nutritionists may provide some assistance to local leaders, but many County Extension staffs use the guide independently.

One of the program's strengths is involvement of participants. The first lesson is an objective self-evaluation by the teen-agers. What do they want to improve? A self-rating form with appearance, performance and personality categories covers items such as size and body shape, complexion, hair. Teen-agers rank themselves: "I'm where I want to be," "I want to improve," "I'd like to work extra hard on this." Food habits are evaluated and plans for changes are made.

Session Two continues the introduction to good eating habits by stimulating thinking about weight control—adding pounds or taking them off—with a personalized weight control chart that discusses foods' nutritive values and caloric contents.

Another lesson emphasizes good grooming, pointing out that the quantity and quality of food people eat affects their skin tone, hair gloss, posture and physique. Personal hygiene tips are given.

In other sessions teen-agers learn to fix quick breakfasts and to select nourishing snacks. A sensible approach to dieting—combining nutritious, low-calorie meals with exercise—is presented in another meeting. For the weight conscious, there is a lesson on low-calorie cooking. Leaders also urge parents to help their teen-agers avoid both skipping meals and making unwise food selections, habits which fads and peer groups often influence.

Recently a second program guide has been developed for leaders of teen-agers with limited reading skills. In this guide each session is subdivided into steps. The objective is the same: to help boys and girls improve their eating habits in an enjoyable way.

In developing a program like "Shape Your Future," professional persons in the community are important resources. A barber and/or cosmetologist may tell about good grooming or how to minimize teen-age blemishes. A physical education instructor or a football coach can emphasize the importance of exercise in keeping trim and fit and in developing good posture that improves appearance. A physician or nurse may stress the importance of good nutrition during the teen-age years. Besides bringing authority and authenticity to a program, these persons often add variety and even glamour.

Various supplemental materials have been distributed in "Shape Your Future" programs. One of the most useful has been a leaflet "Nutrition Games," developed recently by our State staff.

County Extension leaders announce a "Shape Your Future" class in local newspapers, over radio, through scout groups or by direct mail. Some also contact teachers of physical education, health or home economics to reach youths not enrolled in 4-H clubs. Recently in Greenville, a newspaper notice attracted so many participants that two classes were formed.

Whether sessions are held in a classroom or in a leader's home, learning must be fun. In fact, fun and fitness have been key words in promoting wise food habits among more than 4000 South Carolina youths reached by "Shape Your Future."

quotient suggest that the environment in which children at risk of malnutrition live has highly negative effects on mental development. However, early severe malnutrition requiring hospitalization increases chances of low range test scores.

"Undernutrition and the Developing Brain: The Relevance of Animal Models to the Human Problem," Dr. John Dobbing, Manchester, England. To extrapolate findings from animal research to humans, and to assume a connection between the physical brain and its functions, is to speculate. Several interesting parallels do exist between theory and observed clinical fact, and there is a close resemblance between hypotheses concerning vulnerable periods of developing human behavior and hypotheses involving lasting effects of early nutritional restriction on physical brain growth. The period at which clinical undernutrition must be imposed to produce lasting intellectual deficit is also in accord with experimental and observational findings concerning undernutrition and physical brain growth.

"Biological Correlations," Dr. Myron Winick, New York, N.Y. One study of a group of malnourished human infants is attempting to correlate biochemical changes in the brain of those who die and functional changes in survivors. Patients under age six months with severe marasmus who are free of other complicating disease and were full term at birth are studied. Some die before rehabilitation can be attempted. The brain of those who die is compared with the brain of normally nourished, deceased infants. Survivors are matched with a well-nourished, live infant.

In data compiled for the malnourished group, survivors showed decreased brain function; those who died showed cellular and lipid changes in cerebrum, cerebellum and brain stem. Reduction in total brain mass or cell number was directly proportional to a reduction in head circumference. All undernourished survivors with head circumferences below the tenth percentile showed functional deficits. Head circumference, then, correlates with reduced functional capacity in survivors. Perhaps biochemical changes observed in children who died persist in survivors. In animals they do.

bances can result from environmental factors alone.

The strong interrelationship of many environmental factors which accompany malnutrition as contributors to poor development of children may be more basic than was previously thought. Animal studies suggest that early environmental isolation produces the same kind of behavioral effects as early malnutrition. Therefore, the two factors were compared in an experiment with rats.[3]

Two dietary groups were formed: one malnourished from the first day of life until seven weeks of age, and one well nourished throughout the experiment. Each group was subdivided into three environmental units. One unit spent the first seven weeks of life in relative environmental isolation with a minimum of contact with other rats, experimenters, noises, lights. A second unit received supplemental environmental stimulation via daily handling, group living, experience with various toys and geometric shapes. A third control environmental unit experienced standard laboratory conditions.

At the end of seven weeks all animals were returned to control dietary and environmental conditions for a 10-week rehabilitation period after which behavior testing began.

Measures of different kinds of behavior indicated that environmental isolation significantly exaggerated the behavioral effects of early malnutrition. In most cases, early environmental stimulation greatly reduced or eliminated the effects of malnutrition. Thus, rather than being due to permanent brain damage, long-term behavioral effects of malnutrition may be due to alterations in the way the organism interacts and accumulates environmental information.

This inability of the malnourished organism to acquire sufficient environmental information for normal cognitive development may result from physiological perturbations produced by malnutrition and/or from a set of malnutrition-evoked behavioral responses which are incompatible with those behaviors necessary for normal cognitive development. As noted, one behavioral characteristic of malnutrition in both animals and humans is a decreased tendency to explore. Since behavior is cumulative, it is understandable that cognitive retardation may occur.

Conclusions and Implications

Animal research findings indicate that considerably more study should be directed toward changes in emotional responsiveness in malnourished humans. The data also suggest that long-term behavioral effects of malnutrition may result from a disturbance in organism-environment interactions.

One important implication is that "environmental therapy" might be a necessary part of nutritional rehabilitation for malnourished children. Also, if the nutrition-environmental interpretation of malnutrition's effects proves correct, then a state of chronic hunger, and not necessarily malnutrition, may be sufficient to produce profound changes in cognitive development and detract from a child's human potential.

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1. *Geber, M. and Dean, R.F.A. Psychological changes accompanying kwashiorkor. Courrier 6:3 (Jan.) 1956.*
2. *Zimmerman, R. R., Strobel, D. A. and Maguire, D. Neophobic reactions in protein malnourished infant monkeys. Proc. Am. Psyc. Assn. 1970.*
3. *Levitsky, D. A. and Barnes, R. H. Nutritional and environmental interactions in the early development of the rat: long term behavioral effects. Science, in press.*

About the Author

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Nutrition and Society

Although many persons are aware of the association between malnutrition and human development, the interactions between nutrition and society have received insufficient attention. The negative impact of malnutrition and hunger is felt largely by poverty groups who are also subject to various other noxious social conditions. Malnutrition and the conditions associated with it may interfere with the learning process, lower self-esteem, reduce social mobility and damage the relationship between parents and children. All of these tend to produce and perpetuate within a society a disvalued and dysfunctioning group. In affluent societies, permitting children to be hungry violates crucial moral norms. Violation of these moral norms reduces the probability of society surviving in its present form. Hunger amid affluence may create as well as reflect attitudes and values at serious variance with democratic values.

Kallen, D. J. Nutrition and society. J. Am. Med. Assn. 215:94 (Jan.) 1971.

Malnutrition and Mental Development

Because it seldom occurs as an isolated phenomenon, there has been difficulty in determining whether human protein-calorie malnutrition causes or is merely a close associate of poor mental development. Protein-calorie malnutrition is often found in an environment lacking in intellectual stimulation and one which includes poverty and poor sanitation. Poor performance of previously malnourished children is not due to any abnormal changes in the brain, but results from a calorie deficiency which has restricted the child's activities and learning opportunities. To conserve energy via a physiological response to his calorie deficit, he has remained sitting passively for much of his waking life. This reduction in activity may contribute to subsequent poor performance in intelligence tests which assess verbal, social and other skills.

Latham, M. C. and Cobos, F. The effects of malnutrition on intellectual development and learning. Am. J. Pub. Health 61: 1307 (July) 1971.

Nutrition News

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The Importance of Nutrition in Tooth Development

By Samuel Dreizen, D.D.S., M.D.
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Tooth development is a complicated, dynamic process requiring normal functioning of many specialized types of cells. In man, dental development begins during the second month of embryonic life. By the age of eight years, the crowns of all teeth except the third molars have developed. With completion of the root system of the third molars at 18 to 25 years, tooth formation is completed.

Dietary disturbances during the period when enamel and dentin are forming can result in an alteration in the chemical composition, cellular structure and appearance of the teeth. Enamel and dentin do not regenerate; any defect in their structure or composition is permanent and irreversible.

Studies of continuously erupting rodent incisors and of human autopsy and clinical material show that growing enamel and dentin respond differently to nutritional influences. Of more than 40 nutrients known to be essential for man, only vitamins A, C, D and E, and calcium, magnesium, fluorine and protein have been shown to exert a detectable effect on tooth formation. Most detailed data have been derived from rodent experiments. Regardless of species, however, dental developmental defects become apparent only if nutritional aberration is severe and prolonged.

The normal cellular development and appearance of the teeth is affected by a lack of dietary vitamin A, due primarily to degeneration of the cellular tissue responsible for these factors. Experimentally produced vitamin A deficiencies in the rat result in incomplete development of enamel, irregular formation of the dentin and cellular invasion of the pulp.

In man, vitamin A deficiency converts the enamel-forming cells in the developing tooth into nonspecific epithelial cells, causing defective formation of the enamel. Postmortem examinations of unerupted teeth of vitamin A deficient human infants have disclosed degeneration of the enamel organ and poorly calcified enamel and dentin layers.

Normal tooth development of unborn rats has been altered by experimentally inducing a maternal vitamin A deficiency during the period when the molar teeth were developing. This resulted in the production of abnormally small molar teeth in the young. The size differences were not accompanied by gross tooth surface defects, severe histologic changes, metabolic derangements or increased caries susceptibility.

The continuously growing incisors of vitamin C deficient guinea pigs studied are characterized by degeneration of the cellular layer which forms the dentin. As a result, further development of the dentin may be irregular or absent, accompanied by an overcalcification of the predentin. With prolonged vitamin C deficiency, further degeneration of the enamel-forming cells will cause defective formation of tooth enamel.

Studies of developing teeth of scorbutic infants have shown no significant abnormalities. Teeth of vitamin C deficient human adults, however, exhibit an accumulation of blood and fluids in the pulp, and modified primary and secondary formation of the dentin layer. Apparently, functional stresses must be superimposed on vitamin C deficiency to materially alter human tooth development.

Changes caused by vitamin D deficiency during the formative period of the teeth vary with the experimental species. In all vitamin D dependent species, the first and most prominent change is the appearance of a line of disturbed calcification in the dentin. In severe cases, this is followed by a retardation of dentin formation and impaired ability to properly calcify the matrix structure of the predentin layer of the developing tooth.

In the rat, enamel formation and mineralization is not affected by a deficiency of vitamin D. In the guinea pig, dog and man, vitamin D deficiency may be stigmatized by disturbances in the calcification of enamel and dentin which result in formation of interglobular spaces within the dentin and improper formation of the enamel layer.

Vitamin E is essential for the maintenance of the enamel organ of the rat incisor. A deficiency leads to premature atrophy and edema of the papillary layer (outer enamel cellular layer), depigmentation and hypoplasia of the enamel. Vitamin E's role in human tooth formation has not been defined.

About 35 percent of the inorganic fraction of human teeth is comprised of calcium. During tooth development, enamel has a priority over dentin and dentin has distinct precedence over bone for available calcium. Impaired activity of the parathyroid gland, associated with decreased calcium in the circulating blood, severely impedes normal development of the enamel and dentin layers of the tooth. The clinical effects are markedly similar to those produced by excessive fluoride.

Rats made deficient in magnesium by dietary means form unique, sharply delimited, repetitive striations in the dentin, indicative of intermittent disturbances in mineralization. The enamel-producing cells of these animals undergo atrophy and degeneration reflected grossly by severe malformation of the enamel. Whether magnesium deficiency will produce comparable changes in

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Undernutrition and Dental Health

Dental decay has been associated with certain dietary habits in affluent societies. It can also be related to the effects of poverty, since undernutrition during critical periods of human development appears to affect the teeth adversely. A study of rats investigated the effect of limiting protein intake during pregnancy and lactation on the development of teeth and susceptibility to dental caries of the young. Those pups nursed by mothers receiving low protein diets developed less well and had a higher incidence of dental caries compared with well-fed offspring. These effects, however, were not observed when the nutritional stress was imposed during pregnancy.

Navia, J. M., Di Orio, L. P., Menaker, L. and Miller, S. Effect of undernutrition during the perinatal period on caries development in the rat. J. Dent. Res. 49:1091 (Sept.-Oct.) 1970.

Carbohydrates and Tooth Decay

Of all carbohydrates tested in experimental animals, sucrose appears to be most conducive to dental caries. The relative cariogenic properties of sucrose and sucrose substitutes, including glucose, fructose and potato starch, were further investigated. Rats were inoculated with caries-active organisms to produce a cariogenic microflora in the oral cavity. When sucrose intake was restricted by substituting another carbohydrate or by shortening feeding periods, less caries developed on the smooth surface of the teeth than when a diet containing sucrose was fed continuously. Sucrose appears to be important not only for the implantation of organisms but for their activity as well.

Larje, O. and Larson, R. H. Reduction of dental caries in rats by intermittent feeding with sucrose substitutes. Arch. Oral Biol. 15:805 (Sept.) 1970.

Volunteers + Education = Better Health

By Mrs. Barbara Boylon, Coordinator
Emergency Food and Medical Program, Kent County, Michigan

Enthusiastic volunteers augmenting a limited full-time professional staff can add meaningful depth and scope to a nutrition education program. Witness the contribution of Nutrition Aides to the OEO-funded Community Action Program's Nutrition Education Program, begun in January 1970.

The Aides, who represent a cross section of ethnic and economic groups, attend a series of eight weekly training classes taught by a volunteer home economist who utilizes resource persons from private and public sources. Aides learn to teach groups and individuals budgeting, shopping and cooking skills and basic nutrition. Training continues through monthly meetings and special workshops.

For the first series of Nutrition Aide training classes a kitchen and lounge were provided by a local labor union; a senior citizen's group and United Migrants for Opportunity, Inc. furnished child care; and transportation was made available by Home-School Coordinators and Volunteers in Service to America. Continued cooperation of such groups has contributed substantially to the program's scope.

Aides select the audience they feel is best suited to their talents. They usually work with groups, individual families, senior citizens, those on special diets, or with special programs.

Aides involved in group teaching have conducted series of classes for mothers which have been held in elementary schools, a senior citizen's center, the community building of a low-income housing project, the local Red Cross building and private homes (for neighborhood groups).

Classes have included trips to a supermarket and to an open-air farmer's market. Mothers participate in cooking demonstrations. Food group posters and other materials made by the Aides are used in instruction, as are educational materials from the Dairy Council of Michigan, U.S. Department of Agriculture, Michigan State University Extension Service, Michigan Department of Public Health and the food industry.

Individual families are referred to the program by a community health center, four Community Action Program centers and various agencies. Typical of assistance given by Aides is the case of a 36-year-old mother. Although expecting her eighth child, she knew little about proper infant care. She was semiliterate and had lived in dire poverty. However, the father of the family acquired a steady job; the mother was eager to learn.

Aides taught this mother the principles of budgeting, nutrition, cooking, and how to maintain cleanliness. Fearful of supermarkets, she was accompanied to the store and taught how to shop. She also learned how to care properly for her infant. Her family's general health improved, the father gained 20 pounds and the couple purchased a home.

Senior citizens and clients with special diet problems usually do not require long-term assistance, but they often need extra encouragement over a shorter period of time.

Special nutrition education projects include a summer children's program. Using techniques geared to children, the Aides teach nutrition and table setting. Children compile food group booklets and help prepare and serve a hot meal daily for all attending.

Another special program, "Project Family," provides on-going nutrition instruction for patients waiting to be seen at the Community Health Center. Adults and children are served a nutritious snack. Aides then encourage discussion of nutritious meals and provide literature and recipes. Follow-up assistance on an individual family basis is offered. The county nutritionist counsels twice monthly with referred nutrition patients and provides special assistance to Aides as needed.

Nutrition "Bingo"

By Mrs. Doris Trump, Assistant Professor of Food Sciences and Nutrition, Colorado State University, Fort Collins

The Colorado State Department of Education, in cooperation with Colorado State University, has held numerous four-day summer workshops for school food service cooks and managers. Each group of about 400 persons was divided into eight units. Units alternately attended a nutrition class for which a nutrition education "Bingo" game was devised.

A popular learning experience, nutrition "Bingo" was developed to meet specific stated objectives for the class. The game was played at the end of the half-day class and served as a review, reinforced information presented earlier and helped to evaluate knowledge gained.

With some alterations in terminology, the game has also been used in Extension Service work and in a college food preparation class.

To prepare the game, the letters FOOD were printed at the top of game cards which were divided into 16 squares (four horizontally by four vertically). One of 16 names or symbols for nutrients was placed in each of the squares. Terms used for nutrients varied according to the group for which the game was intended. For example, carbohydrate and fat might be used on cards for lay groups; glucose and fatty acids would replace them for a more advanced class.

Since there were 50 participants in each class, it was necessary to make 50 game cards, each with a different sequence of nutrient terms. For the first card, printing of the terms was begun in the first square in the upper left corner and proceeded from left to right on each row of squares.

The nutrients were listed in the same order (1 through 16) on the second card, but the first nutrient term was placed in the second square. For the third card, the first term appeared in the third square and so on. Thus, the location of nutrient term number one progressed to the next position on each successive game card made. Terms left when the last square in the lower right corner was filled were put in the first, second, etc., squares, keeping the proper sequence.

The next step in preparing the game was to write at least four definitions, descriptions or facts about each of the 16 nutrients (food source, use in body, use with other nutrients) and designating under which letter in FOOD each must be found. (For example, under the letter F, a nutrient supplied abundantly by carrots; under O_2, the second O, another name for Vitamin C, etc.) Each fact, definition or description was then typed on an index card.

Each player was given a game card and some beans. The "caller" shuffled the index cards, selected one and read the information about a nutrient plus the letter under which it must be located. For the first few games, the player first recognizing the correct answer called it out, then all who had the correct combination placed a bean on the space. A row covered horizontally, vertically or diagonally constituted "Bingo" or, in this adaptation, "Food."

To review, to evaluate information gained previously and to check for correct placement of beans, the winner named all nutrients covered and gave added information about them.

After most players could call correct answers, the game was played in silence except for the information read by the "caller." When someone won, he gave answers and additional information about each nutrient covered. Prizes were awarded to winners when the game was played in silence.

This game could be adapted for use with any group, from children to senior citizens. Terms selected for the game cards and the descriptions, definitions or other information on the "caller's" cards must be at a level appropriate for the learners. Group participation in a game is an enjoyable way to learn nutrition subject matter.

Trace Elements and Dental Caries

Susceptibility to dental caries is influenced considerably by the chemical composition of the teeth. The role played by trace elements in the chemical composition of teeth has become one of the promising areas in dental caries research. Both selenium and molybdenum have been shown to be essential for the well-being of various animal species. At present, vanadium is not considered essential in human and animal nutrition. Results of various investigations indicate that selenium may increase caries susceptibility, whereas molybdenum and vanadium may have a beneficial effect on teeth. These findings are far from conclusive; much remains to be done before these relationships can be proven.

Hadjimarkos, D.M. Effect of trace elements on dental caries. Advances in Oral Biology (P. H. Staple, Ed.) 3:253. New York: Academic Press. 1968.

Periodontal Disease

A disease of the tissues supporting the teeth, periodontal disease is characterized primarily by excessive resorption of the bony portion of the jaw. This common disorder is one of the major causes of loss of teeth. Its cause is not well understood. One hypothesis is that periodontal disease is a manifestation of dietary calcium deficiency. Studies with experimental animals and observation of humans suffering from periodontal disease tend to support this hypothesis. The recommended daily intake of 800 mg calcium for adult humans may not be sufficient to replace the calcium normally lost from the body. At least 1100 mg calcium per day might be required to equal losses.

Krook, L., Lutwak, L., Henrikson, P. and Whalen, J. Periodontal disease and calcium nutrition. Proc. Cornell Nutr. Conf. pp. 10-14. Buffalo, N.Y. 1970.

growing human teeth awaits documentation.

An excessive intake of utilizable fluorides during the formative period of the teeth will result in calcification defects in the enamel and dentin and in alterations in the chemical composition of the tooth mineral. The reaction is dose- and time-related and is much more pronounced in enamel than in dentin. The growth rate of the human deciduous teeth is much more rapid than that of the permanent teeth and very little fluoride crosses the maternal placenta, so problems associated with excess fluorine are limited to the permanent teeth.

The exact mechanism whereby fluorine interferes with tooth-forming cells in the calcification process is unknown. Fluorine reacts with hydroxyapatite, the calcium-phosphorous crystal lattice of the tooth, to form fluorapatite, which is less soluble. This alteration in chemical composition has been associated with increased resistance of such teeth to dental caries. Approximately 10 percent of children consuming water containing one part per million (ppm) fluoride will develop almost imperceptible white spots in the enamel, reflective of disturbed calcification.

Mild mottling of the enamel, represented by pitted or striated chalky white, brown or even black enamel, occurs in about 50 percent of children ingesting water containing two ppm fluoride. Severe mottling occurs in 90 percent of children drinking water with a fluoride content in excess of five ppm. The discoloration found in association with the mottling stems from penetration of the affected enamel by food stains.

As with many of the other nutrients, data pertaining to the importance of protein in tooth development has been obtained mainly from work with rodents. The findings indicate that the developing teeth are much less vulnerable to a deficiency of dietary protein than is growing bone.

Defective calcification in conjunction with disturbed dentinal matrix formation has been found in the molars of rats fed a diet extremely deficient in either lysine or tryptophan during the formative period of these teeth. Rats given a protein-poor diet during pregnancy and lactation have produced young with molars smaller than the normal size which may not be normally aligned.

Although the cellular phase of enamel formation ends prior to tooth eruption, maturation of the enamel continues throughout the post-eruptive life of the tooth. Maturation involves the molecular exchange of ions between the surface of the enamel and the surrounding fluid environment. Food and saliva contribute to the maturation process of the surface enamel but the reaction rates are comparatively slow.

Measurable changes in the chemical composition of surface enamel such as an increase in the fluoride, zinc, iron and lead content occur only after very long time periods. It is doubtful, therefore, that any minor element apart from fluorine is amassed in surface enamel in amounts sufficient to alter the character of this tissue.

About the Author

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Dr. Dreizen received the B.A. degree from Brooklyn College, the D.D.S. degree from Western Reserve University, the M.D. degree from Northwestern University. He has published more than 100 papers in numerous scientific and medical journals.

Worth Reading

Nutrition in Preventive Dentistry: Science and Practice. By Abraham E. Nizel, D.M.D., M.S.D., F.A.C.D. Philadelphia: W. B. Saunders Co. 1972.

Written for dental and dental hygiene students and practitioners, this practical text should be readily understood even by those with limited chemistry and physiology backgrounds. Technical terms are few and are defined when used.

The first of three sections, "The Science of Nutrition and Its Oral Relevance," discusses the chemistry of nutrients, which are classified according to their major functions. Emphasis is on the physiopathological clinical states produced by excesses or deficiencies of interrelated nutrients.

"Basic Information About Food," Section Two, includes a chapter covering answers to common patient questions about foods and nutrition. These are not limited to oral health but include information of consequence to general health. Another chapter discusses an adequate, balanced diet in terms of nutrients and food.

The book's third section, "The Practice of Nutrition in Preventive Dentistry," provides the dental practitioner with the "how to do it" phases of clinical and applied nutrition . . . how to assess the nutritional status of a patient, how to communicate with a patient, how to motivate a patient to accept modifications of existing dietary practices and how to use food and nutrition for the prevention and control of common oral problems. Especially noteworthy is a chapter outlining step-by-step office procedures for nutrition counseling.

Included at the beginning of each chapter is a listing of the main points covered therein, which serves as an outline and facilitates relocation of specific information.

Appendixes provide added information: "Nutritive Values of Foods in Average Servings or Common Measures;" "Foods and Mixed Dishes Classified According to Food Group and Amounts Commonly Considered as One Serving;" "Equivalent Weights and Measures;" "Average Height and Weight Tables for Children."

Nutrition News

APRIL 1972 VOL. 35, NO. 2

Lactose Intolerance In Health and Disease

By Theodore Hersh, M.D.
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Milk and its products are nutritionally important sources of protein, calories and minerals, particularly the calcium necessary for bone development and replacement. Mother's milk is the infant's primary food. After weaning, substitutes for human milk are used, such as cow's milk in the United States, goat and buffalo milk in other parts of the world.

Recent studies have suggested that some children and adults can tolerate only small quantities of nonfermented dairy foods. These individuals experience gastrointestinal disturbances following ingestion of moderate or, in some cases, even modest amounts of milk or its derivatives. In children, these symptoms are rarely due to a milk protein allergy. They more commonly ensue from a disorder in the digestion of lactose, the complex sugar of milk which is composed of chemically bound glucose and galactose. For normal utilization, lactose must be split into these component sugars by the enzyme lactase prior to absorption.

When lactose intake exceeds what the small intestine can digest, symptoms of lactose intolerance (abdominal bloating, gaseousness, cramps, watery diarrhea and flatulence) may ensue.

When the absorptive function of the small bowel is otherwise normal, lactose intolerance results from a *primary* deficiency of the enzyme, lactase. However, lactase deficiency may also be found in diseases of the small intestine, wherein the enzyme is decreased due to structural abnormalities in the bowel wall. Such *secondary* lactase deficiency may occur transiently after an attack of gastroenteritis or, more chronically, in diseases of the intestinal mucosa, such as celiac disease or tropical sprue.

An intolerance to lactose is suspected from the patient's history relating the occurrence of the aforementioned gastrointestinal symptoms following the ingestion of milk. The diagnosis is further established by reproducing these symptoms by the use of a clinical lactose tolerance test. This test is performed, following a 12-hour fasting period, by oral administration of a solution containing from 50 to 100 grams of crystalline lactose. The unabsorbed lactose provokes the symptoms, with a concomitant failure of the blood sugar to rise significantly above fasting levels. Also, the activity of lactase may be directly determined through biopsied samples of the upper small intestine. In both primary and secondary lactase deficiency, the intestinal specimen shows low levels of lactose digestion.

A separate test, in which glucose and galactose are administered together, may be used to distinguish primary from secondary lactase deficiency. In primary lactase deficiency normal monosaccharide absorption occurs. In diseases of the small intestine, however, the absorption of the simple sugars may also be impaired.

Many patients so affected are instructed to adhere to a lactose-free diet. The elimination of milk and milk products may ameliorate the characteristic gastrointestinal symptoms. Because of the potential loss of a major source of essential nutrients through the elimination of milk from the diet, however, it would be advantageous to the patient to ascertain the *degree* of lactose intolerance.

Dairy foods in amounts recommended for adequate nutrition may be well tolerated if consumed over a period of time, because some residual lactase activity is usually present. This may be determined by initiating the treatment with a lactose-free diet followed by introduction of increasing amounts of milk products, as long as the patient does not experience symptoms. In patients with a secondary lactase deficiency, therapy is directed toward alleviating the intestinal disease. As the gut heals, lactase levels normalize and lactose may again be well tolerated. In instances where populations are being surveyed to determine the extent of lactose intolerance, tests should be performed with doses of lactose approximating the population's usual lactose intake per meal if meaningful information is to be obtained.

Intestinal lactase activity generally decreases after weaning, although in some populations it may persist at high levels throughout adult life, possibly due to past consumption of lactose-containing foods. Experiments have shown varied results with attempts to induce lactase activity by feeding lactose to members of lactase-deficient populations or by maintaining animals after weaning on lactose loads comparable in amounts to those in mother's milk. Prolonged administration of lactose in the diet may be required for adaptive changes in lactase activity to occur.

Lactose intolerance is not often a clinical problem in healthy infants, even in areas where there is said to be a high incidence of lactase deficiency in the adult population. Even in the Thai, Ugandan Bantu and Australian aborigine populations, a high frequency of lactose intolerance is not apparent until the ages of five to eight. Some Oriental and some American Negro children, who have continued to drink milk after weaning, tend to develop intolerance at a later age than those who have received no milk following weaning.

A low incidence of lactose intolerance even in adults has been reported in some Negro populations, such as the Batusi of Uganda who are herders

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Lactose Tolerance Tests

The lactose tolerance test has been widely used to detect lactase deficiency. It consists of oral administration of a solution usually containing 50 to 100 gm lactose with subsequent monitoring of the blood glucose concentration. Flat glucose curves (indicating failure of the blood glucose level to rise at least 20 to 25 mg per 100 ml above the fasting level) are often interpreted as evidence of lactose intolerance and intestinal lactase deficiency.

These studies underscore factors which should be considered when the lactose tolerance test is used as a diagnostic tool. In one study, 18 healthy adults free of milk intolerance and with confirmed normal jejunal lactase levels were tested. Although none exhibited symptoms of intolerance to the lactose solution, about one-fourth had flat glucose curves. Delayed gastric emptying appeared to have contributed to the low rise in blood sugar of some subjects and to the varying times at which they attained their maximum blood glucose concentration.

In the second study, lactose tolerance tests were administered to lactase-deficient as well as to normal adults. This time blood glucose was determined on both venous and capillary samples. Capillary glucose levels have been found to rise higher than venous glucose levels after ingestion of glucose. Tests using venous blood might, therefore, yield smaller rises and flatter curves than those using capillary blood. This did occur. When capillary glucose was used, flat curves were eliminated in normal subjects, but some lactase-deficient individuals also failed to produce flat curves even though they had symptoms of intolerance.

It is concluded that a 60-minute venous lactose tolerance test using an oral load of 50 gm lactose is useful in detecting lactase deficiency if both peak rise in blood glucose *and* development of symptoms are noted.

Newcomer, A. D. and McGill, D. B. Lactose tolerance tests in adults with normal lactase activity. Gastroenterology 50:340 (March) 1966.

McGill, D. B. and Newcomer, A. D. Comparison of venous and capillary blood samples in lactose tolerance testing. Gastroenterology 53:371 (Sept.) 1967.

Nutrition Awareness In The Supermarket

By Jane Armstrong, Vice President, Consumer Affairs
Jewel Food Stores, Melrose Park, Illinois

Two important recommendations made by the Food Retailing and Distribution Panel of the 1969 White House Conference on Food, Nutrition and Health have already been effected. One was to reactivate the Food Council of America, a nonprofit organization of food and retailing associations which had been dormant since the end of World War II. The second recommendation was that the Food Council sponsor a Nutrition Awareness Campaign: a voluntary, industry-wide project conducted for two months of each year (although the Council encourages year-round nutrition emphasis) for at least five years.

Fortunately, Jewel employees had experience in directing our efforts to serving the needs, concerns and interests of consumers. It made good business sense to us to provide our customers with nutrition information.

Our advertising in all four major Chicago newspapers was a logical place to start. We also knew that more than a million consumers are in our stores every week. A Jewel food store seemed to be a natural educational medium—why couldn't it be a classroom in the community?

For the past two years in the fall, we devoted four weeks of total company effort to presenting the subject of nutrition to our customers. The first year, our primary objective was to create an awareness of nutrition. Last fall we went a few steps further: we stressed not only the hows and whys of planning, shopping for and preparing nutritious meals, but the planning of calorie intake as well.

Traditionally, nutrition has been thought of as a dull subject. We decided to put spark and color into it by designing colorful in-store banners, posters, point-of-sale signs, window bills and brochures. We did more than just talk about vitamins and minerals; for example, we mentioned the milk group as contributing to strong bones and teeth. Brochures were designed and written in a way to encourage homemakers to save them and keep them handy for reference when making their shopping lists.

Our company's milk cartons carried a nutrition message; recipes and menu suggestions at the meat counter highlighted the four food groups; signs in the produce department included nutrition information; and Jewel employees from store manager to checker talked about nutrition.

We hoped this in-store emphasis would remind shoppers of what they had read in our ads. Full-page institutional ads urged them to develop the habit of thinking about nutrition as they shopped. Our regular weekend ads emphasized the four food groups. We featured important foods of each food group at special prices. In this way, we "walked" our customers into our ads to read the nutrition message.

Radio and television weren't overlooked. "Good Nutrition is Part of the Good Life at Jewel" and "Jewel Will Help You Do Your Job of Providing Good Nutrition to Your Family Better" were recurring themes.

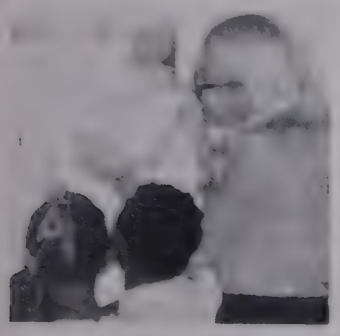
Another avenue was contact with community groups—home economics and consumer education teachers and students; Chicago Nutrition Association and its Community Education Committee; Head Start parents; Program Assistants (nutrition aides) of the U.S. Department of Agriculture Extension Service; and newspaper food and women's editors. Activities ranged from in-store information booths manned by the Program Assistants to providing educational materials for various summer food fairs.

Consumers have written and called us to express their appreciation. Others who help to shape opinions have looked to us for leadership.

Jewel plans to continue nutrition education in the most creative ways we know. It is exciting and encouraging to me, as a home economist, nutritionist and business woman, to be part of a company that has the desire and know-how to do this.

Nutrition "Outreach" for Migrant Workers

By Joanne M. Proulx, Chief Project Nutritionist
Migrant Nutrition Program, Lantana, Florida



In June 1970, the Nutrition Program of the Center for Disease Control, Atlanta, Georgia, contracted the Florida Division of Health to conduct an evaluation of a selected sample of Florida migrant workers and to provide an Outreach Educational Program for families found to have nutrition problems.

In March 1971, the survey was completed. Objectives were set, personnel were trained and "Outreach" began with two teams of four persons each: a nutritionist, a health educator and two community health workers (one black and one Spanish). Each team has a mobile van equipped with a small range, oven, sink, refrigerator and a white chalk board (also used as a movie screen) which is covered with Velcro on the reverse side.

Most of the migrant participants lack reading ability; some cannot understand or speak English. Many work in the fields or packing plants and are very tired when they return home. To overcome these problems, the Outreach teams have had to develop original materials and methods to present information on nutrition, weight control, snacks, dental health and sanitary food preparation and storage. A collection of pictures and pencil sketches, especially those of Mexican-American or Puerto Rican foods, has been helpful.

Presentations are simple and no longer than 30 minutes. Active involvement of participants in each session is a goal, although this may be difficult as they are not group oriented and are inclined to be passive and shy. A home presentation has been one alternative solution for this problem. If a participant cannot attend the van session, a team member takes a packet to the woman's home for an informal visit.

At the beginning of the program, a game enabled team members to roughly evaluate participants' nutrition knowledge. Dairy Council's *Food Models* were placed by each participant under food group headings. Afterward, the nutritionist led a discussion of food groups and explained the basic nutrients in each group.

Other sessions emphasized individual nutrients. Protein was presented as a muscle builder; protein quality differences were explained with a solid brick wall and another lacking a few bricks. A drawing of a brick house and a straw house and the story of "The Three Little Pigs" also effectively illustrated variations in protein quality.

To emphasize the importance of serving size for iron-rich foods, the teams developed a pie-shaped model. The complete pie represented 10 mg iron and the segments represented standard servings of various foods. A color bar showing gradations from deep orange to pale yellow and deep to pale green facilitated the study of Vitamin A. A four food groups symbol using a dinner plate concept has been a serviceable study aid. It is also on the side of our vans, which the children now call "Nutrition Vans."

A problem for mothers was getting children to eat vegetables. One team produced a show (English and Spanish, children's and mothers' versions) with puppets: two children and a mother discussed the problem and solutions. "Mr. Nutrition" passed out vegetable seeds which the viewing children planted. They eagerly await the chance to eat their own vegetables.

Teams also assist families in obtaining free school lunches, commodity foods and health care.

The Outreach Program is almost completed. At its conclusion, migrant families will be resurveyed to determine the effectiveness of our teaching methods. We already know that we have been successful with some of our participants. For example, one Mexican-American mother adds nonfat dry milk to her tortillas; several mothers give their children raw carrots as a bedtime snack, others add ground liver to meat loaf. In general, the participants seem to be making a genuine effort to improve their food habits.

Intolerance: Lactose vs. Milk

This study confirms a high incidence of lactase deficiency and lactose intolerance among Asian Indian adults and a relatively lower incidence among children. It also clearly shows that lactose intolerance does not necessarily imply milk intolerance: some subjects with lactose intolerance or low lactase activity can consume up to one quart of milk daily if it is drunk in small amounts throughout the day. Furthermore, all children who were intolerant of a lactose test solution drank milk containing an equivalent amount of lactose without exhibiting symptoms.

This study indicates that even lactose-intolerant children are unlikely to develop symptoms with the 200 ml of milk per sitting normally provided through nutrition programs in developing countries. Hence, the incidence of lactose intolerance and low levels of lactase should not be used as an argument against the distribution of skim milk to Asian countries.

Reddy, V. and Pershad, J. Lactase deficiency in Indians. Am. J. Clin. Nutr. 25:114 (Jan.) 1972.

What Causes Lactose Intolerance?

Various findings indicate that lactose intolerance frequency in adults varies among ethnic groups. There is controversy over the actual cause(s) of this intolerance. It may be genetically determined or it may be an adaptive phenomenon that is influenced by the level of lactose intake. A study conducted with 24 Chinese born in Australia tends to support an adaptive etiology for lactose intolerance. This group had a markedly lower incidence of lactose intolerance than did Chinese students resident in Australia or indigenous adult Chinese in Singapore. This lower incidence suggests that an environmental rather than a genetic factor was operative and that this factor was a high intake of lactose among the tolerant subjects.

Bolin, T. D. and Davis, A. E. Lactose intolerance in Australian-born Chinese. Australian Ann. Med. 1:40 (Feb.) 1970.

and milk drinkers.

Hereditary factors appearing after the weaning period or an acquired enzyme defect due to scant ingestion of dairy foods after weaning have been postulated as causes of lactase deficiency. Environmental factors may also play a role in some areas of the world, for poor sanitary conditions are often associated with recurrent gastrointestinal infections and intestinal parasitosis. These conditions will injure the bowel wall, thereby destroying intestinal lactase.

In recent years, there has been an increasing number of scientific and lay reports regarding low lactase levels in some population groups. Many of the studies on which these reports have been based utilized the lactose tolerance test described earlier. It should be recognized that these doses exceed the amount of lactose contained in four glasses of milk. Yet these reports often inaccurately equated *lactase deficiency* (or lactose intolerance) with *milk intolerance*.

It has been implied that groups designated to be lactose intolerant (albeit on test dosages greatly exceeding customary intakes of dairy foods) are therefore intolerant to milk and that milk should not be used in domestic and foreign feeding programs directed toward these people.

While many of these population groups reportedly cannot tolerate 50 grams of water-diluted crystalline lactose ingested at one sitting without concurrent ingestion of other foods and so are labeled lactose intolerant, the very same groups can drink moderate amounts of milk without gastrointestinal distress.

It is evident that the incidence of lactose intolerance as it relates to normal milk consumption has been grossly overestimated because of the techniques often employed to acquire the data on which recent conclusions about the problem have been based. Before any decisions are made regarding the continued use of milk in foreign and domestic feeding programs, more research is needed to obtain information about the rate at which different ages and races can digest lactose; whether the enzyme lactase can be induced and/or maintained by continued ingestion of lactose-containing foods; reasons for unacceptance of milk when there is no evidence of lactase deficiency; and the many environmental factors which may temporarily influence the ability of an individual to digest lactose.

For some individuals with more pronounced or symptomatic lactase deficiency, fermented dairy foods such as yogurt and cheeses comparable in nutritional value to milk can be substituted for nonfermented milk products. Another important factor worthy of investigation is the pretreatment of dairy foods with microbial lactases to reduce the lactose content.

More careful study of the degree, causes and possible solutions of lactose intolerance might enable more individuals to ingest the valuable nutrients and calories derived from milk.

About the Author

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Dr. Hersh recently moved to Providence, R.I., where he is Associate Professor of Medicine, Brown University; Associate Director of Gastroenterology, and Assistant Physician and Associate in the Division of Medical Research, Rhode Island Hospital; and Attending Physician, Providence Veterans Administration Hospital. He formerly was Associate Professor of Medicine and Acting Head of Gastroenterology at Baylor College of Medicine, Houston, Texas.

Dr. Hersh's A.B. degree, *cum laude*, was earned at Harvard University and his M.D. degree at Columbia University. He is the author of more than 100 published papers and abstracts.

Worth Reading

Journal of Nutrition Education. Helen D. Ullrich, Editor. Berkeley, California (119 Morgan Hall, University of California 94720): The Society for Nutrition Education. $6.00 per year; issued quarterly.

Now in its third year of publication, the *Journal of Nutrition Education* is directed to interpreters of nutrition science and motivators for the development of good nutrition practices. Regular features include an editorial; letters from readers; program ideas; international news; information on current topics; pertinent excerpts from articles and speeches; reviews of pamphlets, booklets, visual aids, books, journals. Attitudinal studies, surveys, educational techniques designed for specific groups and testing methods are some of the subjects covered in articles. The journal is published by the Society for Nutrition Education, incorporated in 1968 to promote good nutrition for all by helping to make nutrition education more effective.

Glances

Milk Consumption of Puerto Ricans

This study of milk consumption patterns of Puerto Rican preschool children in rural New York examines the validity of recent generalizations that non-Caucasian children often reject milk. Food intake data were obtained during home visits and interviews with 62 families.

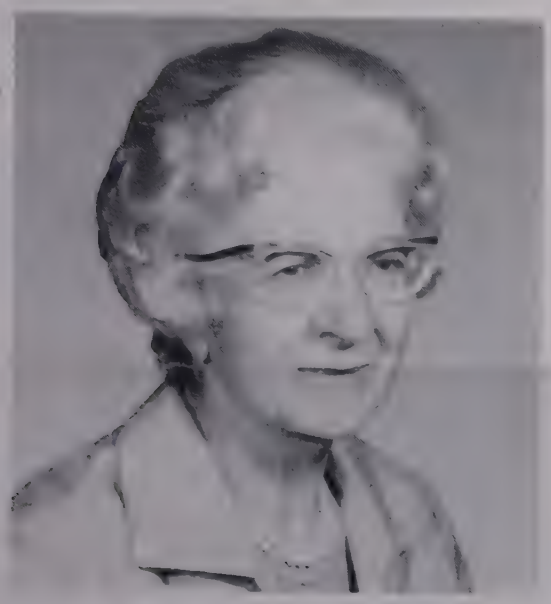
A major finding of the survey was that the average milk intake per child was 677 gm daily (approximately 2¾ cups), which is high when compared with previous reports of milk intake of Puerto Rican children living in Puerto Rico. Milk was found to contribute 97 percent, 125 percent and more than 80 percent, respectively, of the Recommended Dietary Allowances for calcium, riboflavin and protein.

Sanjur, D., Romero, E. and Kira, M. Milk consumption patterns of Puerto Rican preschool children in rural New York. Am. J. Clin. Nutr. 24:1320 (Nov.) 1971.

Nutrition News

OCTOBER 1972 VOL 35,

Psychological Implications of Obesity



By Hilde Bruch, M.D.
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Baylor College of Medicine
Houston, Texas

Millions of people are, or consider themselves, too fat. There are no psychological problems applicable to all these persons. "Psychological implications of obesity" herein refers only to what I have learned from people who came for psychiatric help after they failed to lose weight with conventional treatment. All had repeatedly undergone reducing regimes but had become emotionally disturbed during such efforts, or had been unable to maintain a weight loss.

No figures are available about the incidence of such psychological disturbances in obese people. Whether or not these disturbances occur in a large percentage of overweight people, such "problem" cases are frequent enough to keep physicians and nutritionists puzzled and dissatisfied with their remedial efforts. These patients are often discounted in reports of treatment results because they are "uncooperative." In considering obesity there should be differentiation between two basic groups: *those who can reduce* and function well while doing so and *those who encounter serious difficulties while dieting* and often find it intolerable. I shall focus here on the problems of these troublesome cases, from whom it was learned in extended contact, that in spite of the handicap of overweight, there are people who function better at a higher level of weight. In them, obesity, though a faulty adaptaton, may serve as a protection against more severe illness. For such people reducing is not the cure of their problems; at best, as the underlying problems are clarified and resolved, dieting may become possible, a sign of their being now capable of handling problems of living in more rational and appropriate ways.

In evaluating psychological problems it is necessary to differentiate between the factors that play a role in the *development* of obesity, those that are *created* by the obese state in a culture that is derogatory towards even mild degrees of overweight, and finally the tension and conflicts that are *precipitated* by efforts at reducing. In each phase physiologic and psychological factors interact and influence each other.

Psychological problems of obese people are frequently said to be due to the rejecting social attitude. The insults are real enough, and there appears to be an increase in the condemnation of overweight. One might say that the social-cultural climate for the obese, at least for those of middle and upper class background, has deteriorated. Intimate contact with individuals who are hurt by this cultural rejection, reveals that they suffer also from severe self-doubt, have an inadequate self-concept and poor body image, and are extremely dependent on the opinion of others in all areas, not only in weight and appearance. Obese adolescents, and adults whose excess weight goes back to childhood or adolescence, are particularly vulnerable. They may come to feel that they deserve this discrimination. They consider themselves ugly and loathe their body and its large size. Yet when they try to reduce they feel diminished and empty, and become even more unhappy. People who grow heavy after they reach adulthood, do not express such self-derogation, nor do they expect that they would set everything right and change their pattern of living by losing weight.

There is a tendency to consider this condemning cultural attitude the cause of the negative self-concept. This is not so; it is only a part of the problem. A large group of fat children who were seen in a pediatric clinic during the 1930's and whose development was followed into adulthood, showed a wide variation in their self-concept and overall adjustment. Those who had experienced an accepting and encouraging attitude from their families developed a good self-concept and positive body image. They did not suffer excessively from the negative cultural attitude but made a healthy adaptation that included the ability to maintain control over their weight, though often at a level above the average. In contrast, those with early signs of emotional disturbances that were associated with severe intrafamilial problems and conflicts, did poorly weight wise and adjustment wise. They suffered excessively from the cultural attitude, experienced as rejection. They had shown as children signs of body image disturbances, had done poorly on the Draw-A-Person Test, and showed many discrepancies in responses to psychological tests. It seems that those who eventually become psychiatric patients and whose psychological problems are closely interwoven with the factors that make for obesity, come from this second group, those with early signs of inner trouble.

It is necessary to evaluate for each patient the functional significance of his abnormal weight in relation to his whole development. With this approach three main groups can be recognized. The largest group includes overweight people whose moderate and fairly stable weight excess developed after adolescence and who, like people of normal weight, may encounter psychological difficulties not related to their weight problem. Confusion about the significance of psychological factors in obesity may be due to failure to separate observations on such ordinary overweight people from those made on patients in whom the weight and psychological difficul-

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Behavior Modification

Until recently, reports in the medical literature indicated that weight reduction programs for the obese had not been very successful. The current interest in behavior modification has prompted researchers to assess its role in the treatment of obesity. Thirty-two patients, all at least 20 per cent overweight, participated in a study in which one half was treated with a behavior modification program and the other half received traditional therapy. The main objective of the behavioral program was to develop self-control of eating, with weight loss as a consequence. Although both groups performed well by accepted standards, the group treated with behavior modification lost more weight than the control group. It is concluded that behavior modification may represent a significant advance in the treatment of obesity.

Penick, S. B., Filion, R., Fox S. and Stunkard, A. J. Behavior Modification in the Treatment of Obesity. Psychosom. Med. 33:49 (Feb.) 1971.

Satiety and Obesity

A study was performed to test the hypothesis that obese individuals take longer to recognize a point of satiety than do normal-weight or thin persons. Each subject was shown a series of slides of various foods and asked for his subjective reactions to the slides. A beverage was offered to the subject after every four slides. The process was repeated until the subject refused the beverage. Results showed that the obese saw more slides and drank more beverage than did the thin subjects before they refused the beverage. In reporting their subjective reactions the obese subjects used more ratings of neutral, pleasant and appealing, whereas the thin subjects used unpleasant and disgusting. The authors conclude that the inability to achieve the point of satiety may differentiate the obese from the normal-weight or thin individuals.

Linton, P. H., Conley M., Kuechenmeister, C. and McClusky, H. Satiety and Obesity. Amer. J. Clin. Nutr. 25:368 (April) 1972.

A Two-Way Street to Nutritional Care

By Jean L. Bowering, Assistant Professor and Mary A. Morrison, Professor
New York State College of Human Ecology, Cornell University, Ithaca, N.Y.

Establishing a nutrition education program in East Harlem, New York City, involved the cooperative effort of three groups — the New York State College of Human Ecology at Cornell, the Department of Pediatrics of New York Medical College and the East Harlem Health Council. Their combined capabilities in medicine, community relations, communications and nutrition science allow the operation of a multi-disciplinary program far beyond that possible for any one group alone.

In the summer of 1970, the East Harlem Nutrition Education Program, supported by Expanded Food and Nutrition Education funds, opened a center in a renovated brownstone house on Lexington Avenue. Here, two nutritionists from Cornell draw upon the resources of all three groups. A planning committee with members from each cooperating organization assists the program staff. While the project deals with many facets of nutrition, focus is on alleviation and prevention of iron deficiency anemia in pregnant women and infants.

Transmission of dietary information to the East Harlem community exists at both professional and para-professional levels. The Maternal and Infant Care Clinic at Metropolitan Hospital serves pregnant women whose health and obstetric history places them at high risk. Many of these women participate in the East Harlem Nutrition Education through home visits by para-professional teaching aides. The aides, all homemakers from East Harlem who are trained by the two nutritionists at the program's Lexington Avenue center, learn to help families cope with problems of shopping and budgeting, meal planning and preparation, and difficulties with infant and child feeding.

In the prenatal clinic at Metropolitan Hospital, a nutritionist evaluates the women's diets and makes recommendations where needed to improve nutrition during pregnancy. After delivery, the women are urged to come to the maternal clinic and to bring their babies to the well-baby clinic.

The East Harlem program is a unique two-way street between the home and the clinic. When the physician or nutritionist at the clinic identifies a patient with symptoms of iron deficiency or other obvious nutritional problem, an aide is referred to the family. Such referrals are especially successful since the neighborhood aide stands a good chance of gaining rapport with the family.

In the other direction, aides promote medical care for pregnant women and their babies by encouraging them to visit the clinic regularly. The clinic visits provide families with nutritional advice beyond that they get by working only with an aide.

One aspect of the program involves taking into account food habits, attitudes toward child feeding and diet in pregnancy as practiced in East Harlem. Socio-cultural factors along with biological factors must be understood if a program aimed at alleviating nutritional problems is to succeed.

One of the unique qualities of the East Harlem Nutrition Education program is its built-in capacity for feedback from dietary and clinical-biochemical observations for application to individuals in the education-action program. If, in the clinic or laboratory, we find evidence of a dietary problem, the nutritionist and aide work together to help the homemaker improve her diet. The project is designed so that we can evaluate the effectiveness of our educational effort as we go along — hopefully in terms of improved nutritional status and a more receptive attitude toward medical care and nutrition.

Cooperation between professionals in maternal and infant care clinics and para-professionals in teaching aide programs can extend existing services in the community, increase the impact of each program and strengthen communications between families and the institutions trying to serve them.

Day Camping with a Different Twist

By William Winkenwerder, Youth Nutrition Specialist
Oregon State University Extension Service, Corvallis, Oregon

Day camps can be built around the idea that learning about nutrition can be fun. This is one tool used to teach young people in ten Oregon counties participating in the Expanded Food and Nutrition Education Program (EFNEP) conducted by the Oregon State University Extension Service.

Basically, the camps are designed to help children recognize a pattern for good eating. Awareness is created by having the boys and girls, ages 8 to 12, prepare and eat good food in the relaxed, outdoor settings. This awareness is reinforced by games, songs, arts and crafts, and dramas about nutrition.

The children, most of whom come from disadvantaged families, learn to identify a variety of foods important for health. As they sample this variety, hopefully they begin to recognize that food affects how they feel and act.

Other objectives established by OSU and incorporated into the three-day camps include creating opportunities for the child to experience personal success, group living with personal and shared responsibilities, fun and friendship, a chance to be a leader, and to learn and make games he can share with his family.

A key to the camp program is learning by doing. The child participates in the learning experience with the volunteer leader-teacher.

For instance, the basic four food groups may be taught by means of a treasure hunt. The day campers are divided into sections to search for models from each of the four food groups. The first section back with models from all four groups wins the game. The prize? Often a chance to be first in line for a vitamin C enriched cold drink.

A nice thing about the game technique is that the children seem to pay close attention to what is said about foods in each of the four groups when they realize it is related to a game they are about to play.

Nutrition even enters into arts and crafts activities, a favorite program for this age. Rock painting includes furnishing water color paints, brushes and one rule — you must paint either a fruit or vegetable.

After finishing their masterpieces, each child shows (and sometimes explains) what he created. The volunteer leader-teacher uses this as another opportunity to emphasize the importance of fruits and vegetables.

Nutrition may feature in original songs, too. On a hike, a group may be heard singing to the tune of "Yankee Doodle" —

The six best doctors anywhere
And no one can deny it,
Are sunshine, water, rest and air,
Exercise and diet.

During food preparation and sometimes at mealtime, clever volunteer leaders find chances to ask and answer questions about food.

These volunteer leaders, the key to success of the program, find day camp activities an enjoyable way to teach. Training is important for both the volunteers and the Extension Aides. These aides are paid para-professionals drawn from the target population of the EFNEP effort.

In-service training for both the volunteers and aides is conducted by professional extension staff members. They provide consultation also during the actual camping periods.

Some volunteer leaders are adults who come from disadvantaged families already enrolled in EFNEP. Others are college students, many of whom receive credit for their work.

Although it is not possible to measure behavorial change in such a short duration program, evidence of nutritional awareness is seen in the children's response to nutrition-related questions. Because of the youth education efforts of EFNEP, disadvantaged children at least have been exposed to simple nutrition information. It may help them to make better judgments about the sometimes distorted messages of some communications media.

Taste Sensations

Food intake is controlled by a complex interaction of internal and external signals. It has been theorized that obese people are highly sensitive to external stimuli (such as the taste, smell or sight of food) but are relatively insensitive to internal, or physiological, signals. A comparison was made between the response of obese and normal-weight individuals to sucrose solutions after fasting and after ingestion of a glucose load. Initially sucrose was pleasant at all concentrations to fasting normal subjects. After glucose ingestion, the sweet sensation became unpleasant. Obese subjects, on the other hand, seemed to feel little difference between the pleasantness of the taste of sweet solutions before and after glucose loads. These data lend support to the theory that obese people are generally unaware of internal signals for control of food intake.

Cabanac, M. and Duclaux, R. Obesity Absence of Satiety Aversion to Sucrose. Science 168:496 (April 24) 1970.

Weight Control System

This paper discusses the physiological and psychological components of the body weight control system and distinguishes between the two types of obesity: juvenile-onset and maturity-onset. Available evidence indicates that biological disturbances early in life can induce irreversible changes that affect the weight control system so it operates permanently at an abnormal level, leading to juvenile-onset obesity. A similar mechanism may lead to a distorted body image and other perceptive disorders. In the mature obese, on the other hand, the disturbance occurs after the development of body structures is completed. The adipose tissue is normal and feedback signals are properly settled. This type of obesity can be of psychological, biological, socioeconomic or cultural origin.

Cioffi, L. A. and Speranza, A. Physiological and Psychological Components of the Body Weight Control System in the Obese. Bibl. Nutr. Diet. 17:154, 1972.

ties are intermingled.

Even these patients are not in a uniform group. Psychological factors were first recognized in people who grew obese following some traumatic event *(Reactive Obesity)*. This was described as "paradoxical obesity" by German and French authors after World Wars I and II, in women who became obese after severe mental shock, as bombing, evacuation, or loss of a loved one. Obesity may develop under less dramatic events such as separation from home or fear of loneliness, that cause depression in other people. The relationship may not be recognized until depression develops as reducing is attempted.

In *Developmental Obesity* the weight disturbance is intrinsically interwoven with the whole development, and is often associated with severe personality disturbances. Yet not all fat children suffer from it; in many excess weight is an expression of their constitutional make-up. In a majority of fat children and adults whose obesity goes back to early life, constitutional factors are intermingled with severe emotional disturbances. Such individuals grow up in families that fail to respect the children's individual needs or to reinforce their striving for self-expression. Though the clinical picture may vary, such fat youngsters have certain features in common. The most important is the feeling of not being in control of their own sensations and actions. They fail to organize awareness of the signals of bodily urges, in particular awareness of hunger as a signal of nutritional need.

The early life experiences of such patients, when reconstructed, reveal abnormal patterns. Though usually well cared for, their own expressions of need have been disregarded; instead, the mother superimposed what she felt the child needed and when, according to her own concepts and impulses. These were imposed upon every detail of his physical and psychological care. Thus the developing child was deprived of an important learning experience, that of felt discomfort, appropriate response and felt satisfaction. What is clinically apparent is a deficit in the regulation of food intake. The old reproach that obese people have "no will power" may describe a functional deficit in proper "hunger awareness."

This deficit in perceptual and conceptual awareness of "hunger" is a prerequisite for the misuse of the eating function in the service of various non-nutritional needs, with widely different symbolic meanings. Whatever emotional tension or frustration is experienced, the individuals react with the feeling of "needing to eat" and are helpless in controlling these impulses. They often complain about feeling empty, and act and behave as if their center of gravity is not within themselves but somewhere in the outside world, controlled by someone else. They bemoan their fate of being "too fat," use the obese state as an alibi for their handicaps, yet feel helpless to change the state of affairs.

Though obesity is a serious social and psychological handicap, weight loss alone is unable to solve such persons' underlying problems of living. Their attempts at reducing, which may even lead to remarkable weight losses, usually increase the psychological difficulties. For successful weight control they need to become aware of the conflicts and circumstances under which the excess eating takes place, and they need help in growing beyond their basic sense of incompetence and helplessness.

About the Author

Hilde Bruch, M.D.

Dr. Bruch's interest in obesity and psychotherapy and her extensive studies and practice in psychiatry, preceded by training and experience as a pediatrician, are to become even more widely helpful through publication of her new book, *Eating Disorders: Obesity and Anorexia Nervosa*, by Basic Books, N. Y. Now Professor of Psychiatry, Baylor College of Medicine at Houston, Texas, Dr. Bruch's research involves psychological aspects of obesity and other eating disorders.

Worth Reading

Nutrition, Behavior, and Change. By Helen H. Gifft, Marjorie B. Washbon, and Gail G. Harrison. Englewood Cliffs, New Jersey: Prentice-Hall, Inc. 1972. $9.95.

The complex human factors that are involved in food behavior are too little known or understood. Yet anyone concerned with nutrition education deals primarily with people. This unusual and timely book gives a comprehensive view of the many intricate influences upon people's eating habits and guidance in developing planned change.

Acknowledging the limitations and inexactness of scientific probings into the causes of human food behavior, the authors offer a synthesis of "research findings, theory, and empirical knowledge accumulated from a variety of fields." Incorporated are convictions from the evidence available and the experience of the authors as nutrition educators.

The first six chapters of the book analyze the need for nutrition education as our society and the science of nutrition progress. These sections discuss the development of our food consumption patterns; the social, cultural, individual, economic, and psychological influences; the effect on the individual's well-being; and problems in identifying need for change.

In the last three chapters, nutrition education is considered as planned change. The authors outline principles to guide educational attempts, selection of attainable objectives, planning for evaluation, and adaptation to different types of audiences. There is no attempt to give specific procedures but rather a perspective from which educators can make decisions and devise suitable techniques for the situations they encounter.

The focus and content of this book differ from that of many books on nutrition. Its chapter summaries, documentation, and suggested readings increase its value. Designed for student courses in nutrition educaton, its not overly technical information will interest some laymen, but chiefly professionals who are concerned to help people apply more satisfactorily the science of nutrition.

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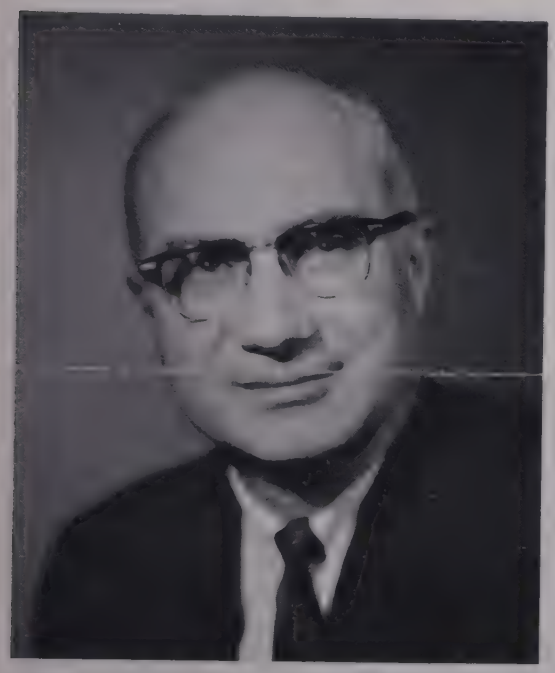
The Roles of Cholesterol in Normal Metabolism



By Raymond Reiser, Ph.D.
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The castigation of cholesterol as a causative agent of atherosclerosis and coronary heart disease has led to a concept among laymen that it is a substance without virtue. Its normal role bears repeated emphasis.

Since cholesterol is produced by animal tissues to serve certain functions, its ingestion is incidental to the consumption of animal food and nonessential, except possibly in the case of milk consumption by the suckling animal, a possibility discussed later.

The body disposes of excess ingested cholesterol either by excretion or by storage. This disposition is a complex phenomenon that cannot be adequately treated here. However, it is pointed out that the main routes of disposal are through the feces by nonabsorption of both diet and biliary cholesterol, and by excretion of bile acids. A secondary defense against excessive accumulation of cholesterol is the mechanism by which dietary cholesterol controls hepatic cholesterol synthesis.

There are differences in the efficiency with which individuals use these mechanisms. As a consequence, cholesterol is accumulated to different degrees.

Cholesterol in Membranes

Cholesterol is a constituent of the membrane around nerve fibers, the myelin sheath. The mechanism of action of cholesterol in the myelin sheath and in other membranes is not known, but since different membranes serve different functions and contain different amounts of lipids and cholesterol, it may serve different functions in each membrane.

The myelin sheath is about 75 percent lipid and appears to serve as insulation for the nerve fiber. There is a constant ratio of cholesterol to phospholipid, and it is theorized that the cholesterol prevents the fatty acid chains of phospholipids from setting into either gel or crystalline conditions. This concept is reasonable in myelin which contains mainly saturated fatty acids, but not so reasonable in membranes of other structures in which the phospholipids are more unsaturated. However, the rough correlation that exists between chain length, unsaturation, and cholesterol content of membranes, adds support to its possible function as an inhibitor of lipid chain mobility.

Cholesterol has also been said to fit into the mosaic concept of membrane structure as a cholesterol-lecithin complex. Regardless of how cholesterol may function as an inhibitor of crystalline formation, it must also fit into the structure of the membrane in some way if only because of the fact that it is there, and in a reasonably constant ratio to constituent phospholipids.

In Soluble Lipoproteins

Cholesterol is also an integral part of blood lipoproteins. Whereas only free cholesterol is present in membranes, both esterified and free cholesterol are present in circulating and other soluble lipoproteins. It is not clear whether the cholesterol-protein complexes in circulating lipoproteins is a mechanism for the transport of cholesterol, or whether the cholesterol serves some special function there. In spite of their reasonably constant composition, free cholesterol rapidly exchanges between the various lipoproteins. Perhaps the cholesterol composition of lipoprotein is truly constant but this cannot be ascertained until pure lipoproteins are isolated. The lipids of the chylomicrons, which are about 80-95 percent triglyceride, contain approximately 2 percent cholesteryl ester and 1 percent free cholesterol. The cholesterol content of the true lipoproteins relative to 100 part of protein are: very low density 63, low density 102, high density 56.

It is believed that the low density lipoproteins are deposited under the inner lining of the artery to form atherosclerotic plaques.

A Precursor of Bile Acids, Steroid Hormones, and Vitamin D

A major function of cholesterol is as the precursor of bile acids and their salts, which serve as the principal route for cholesterol disposition. Once produced, the bile salts are excreted into the intestine in the bile via the bile duct, being stored temporarily in the gallbladder.

Economical Nature, however, makes use of these products of cholesterol before discarding them. Bile salts are excellent detergents, and are used as the first step by which the aqueous tissue system is able to handle and use water-insoluble dietary fat. Fat in the small intestine (duodenum) acts to stimulate the emptying of the gallbladder. The bile salts themselves stimulate the secretion of bile by the liver and of lipase, the enzyme that digests fat, by the pancreas. Through their detergent action bile salts disperse (emulsify) diet fat, tremendously increasing the amount of fat surface and thus permitting lipase, which acts at surfaces, to digest the fat. The bile salts and the products of the digestion which are also detergents, act together to reduce the fat emulsion to particles of dimensions that can pass through the cells of the intestinal mucosa. Fat-soluble vitamins are dispersed and absorbed along with the products of fat digestion. In the absence of bile neither fat nor the fat-soluble vitamins are absorbed. As a consequence, calcium in the diet forms soaps with the fatty acids and is excreted, resulting in calcium deficiency. Thus cholesterol, through its conversion to bile salts, plays a basic role in fat, vitamin, and mineral absorption.

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Four issues annually: February, April, October, December

Cholesterol Intake in Early Life

Because of previous reports of dietary effects on enzyme development, the authors have hypothesized that high cholesterol intake early in life helps establish a permanent mechanism for maintaining low serum cholesterol concentration in adulthood. A study was conducted with rats to test this hypothesis. The adult male rats showed lower levels of serum cholesterol as the concentration of cholesterol in their dams' milk increased, thus providing support to the hypothesis. How the control is effected is still a matter of conjecture. One possibility is the establishment of a feed-back control of cholesterol synthesis by the liver. Other points of possible control include cholesterol absorption and bile acid formation. Further studies are needed to determine the mechanism of control of serum cholesterol by early postnatal cholesterol ingestion.

Reiser, R. and Sidelman, Z. Control of Serum Cholesterol Homeostasis by Cholesterol in the Milk of the Suckling Rat. J. Nutr. 102:1009 (Aug.) 1972.

Cholesterol vs Heart Disease

Changes in cholesterol intake of the civilian population from 1909 to 1965 were determined from food "disappearance" figures compiled by the U.S. Department of Agriculture. The corresponding changes in serum cholesterol were also calculated, using appropriate formulas. Results showed that in the past 50 to 60 years the serum cholesterol changes associated with changes in dietary fat and cholesterol consumption have been small, ranging only from about 1.6 to 6.7 mg per 100 ml. This indicates that the increased risk of coronary heart disease reported to have occurred during this period is not related to dietary fat changes to a great extent. The author concluded that other environmental factors are more probably associated with having raised the risk from that of 50 years ago to the present level.

Kahn, H. A. Change in Serum Cholesterol Associated with Changes in the United States Civilian Diet, 1909-1965. Amer. J. Clin. Nutr. 23:879 (July) 1970.

Weight Control in a Mental Hospital

By Diana L. Deputy, R. D.
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"Please bring three dozen cupcakes" is a standard request to volunteers at this 2400-bed mental hospital. Quantities of food, such as candy, cake, ice cream and cookies are supplied as part of the entertainment of patients. It is well known in this community that our patients love to eat. Their preoccupation with eating has sometimes made the volunteers dubious of our food service. Although the hospital menus are nutritionally adequate, an abundance of such foods as rice, dried beans, potatoes, and puddings are served to use government surplus commodities and supplement our allotted low daily food cost. The two canteens are also well patronized.

Many patients are obviously overweight or obese. The mentally ill person who may be confused and lonely in institutional living, who has been slowed down by drugs, and who wears shapeless, unstylish clothes, often finds solace in eating.

"Reducing diets have no place in a mental hospital." This belief was expressed to me when I became the hospital dietitian. Standard, low-calorie diets had been ineffective and expensive. However, I felt the hospital should assume some responsibility for this health problem.

To initiate this concept, we formed a weight control group to counsel patients who needed and desired to lose weight. The first group of 12 was approved by a doctor. All the patients were long-term, regressed females. Another dietitian and I met weekly with them, always on the same day and at the same time, so they could feel our interest in them and depend on us. At meetings, we talked about how many had stayed on "their diets" (self-selected from the regular food), we played games, took walks, and visited other parts of the hospital. The patients' weight losses were announced to the group amid much applause. Small prizes were given of donated cosmetics and toilet articles. These were used to reinforce their efforts and encourage them to improve in appearance. Sometimes we served low-calorie refreshments. At first all the interaction was between the leader and individuals. It was months before conversation became spontaneous. Eventually the group began to look forward to and plan the meetings. As patients became closer to us and each other, the prizes became unimportant. The reward was the approval of others.

Through weight loss a patient's self-esteem and self-concept improved and she had renewed confidence and pride in herself. One patient was discharged, others are now employed in the hospital, and all seem happier.

Since the initial success, other weight control groups have been formed, usually by the psychiatric practical nurses with the dietitian as consultant. One example is a group of young girls in Vocational Rehabilitation who are urged to reach ideal weight before leaving the hospital. It is a chance to teach good food habits that can be used when these girls go home. Booklets such as Dairy Council's *Personalized Weight Control* are helpful.

At first we had to overcome the attitude of some psychiatric aides who felt it was impossible for these patients to lose weight. Now each class of Aide-Trainees is given an explanation of the *Guide to Good Eating* and food values, as shown on *Comparison Cards*, are applied to our menus. We find that these aides cooperate and help as they encourage patients to lose weight and compliment them on the improvements in their appearance.

Since I have explained the weight control program to our volunteers, they, too, cooperate. We try to deemphasize food for entertainment of these patients. It is more rewarding to give time, sympathy, and concern to them than a cupcake.

Our results have been slow but rewarding. If one patient can start on the road to recovery and return to a normal life, it is worthwhile. This, and much more has been achieved.

Slogans Can Work

By Inyang Ekpenyong, Nutrition Consultant, Project PRESCAD
Wayne County Department of Public Health, Detroit, Michigan

Project PRESCAD (PREschool, SChool, and ADolescents) is a comprehensive health program for children and youth of Wayne County. Its slogan, "PRESCAD Cares," expresses its philosophy. Last summer (1971) a slogan, "Give a Kid a Job, Give a Kid a Summer," was used in Detroit as an appeal to the community to do something for our young folks to help make their summer meaningful and pleasurable. As its role, the nutrition section of PRESCAD worked with a group of inner-city youth with weight problems.

The group, formed with the aid of the social worker, consisted of registrants who had had physical examinations by a PRESCAD doctor. All were overweight except two, who were underweight. A few were obese. Since the term "weight-watching" is unappealing to many teenagers, our approach focused on the thoughts, the likes, and the dislikes of the group.

We first identified those foods the group frequently ate as snacks. Potato chips, soft drinks, cookies, and candies were popular. Ice cream was a desirable choice. Little mention was made of fruits, vegetables, or meats. These the group considered part of a three-meals-a-day pattern which most of them did not follow.

Eating habits were neither condemned nor condoned but rather each member listed his or her likes and dislikes. Favored foods were chiefly the commonly-eaten snack foods. Talk of food habits was dropped for a while. Instead, the next four clinic sessions dealt with how the body uses food. Literature, filmstrips, and slides from the Dairy Council were stimulating tools and the group showed keen interest in the subject matter.

The most exciting aspect of the summer program was two field trips. The main objectives were: 1) to demonstrate that some of the low-calorie, not-so-well-liked foods could be prepared and combined in ways to be attractive, nutritious, and acceptable; 2) to give these kids a pleasant and educational summer experience as well as weight-watching information.

The first trip was to a swimming resort about 35 miles from the inner-city of Detroit; the second to a nearby amusement park. With donations from the United Community Services, PRESCAD staff, and some local merchants, we were able to pack low-calorie lunches and cover the cost of admissions.

The lunch period afforded practical application as well as discussion about selecting favorite foods, including so-called "junk foods." Menu selections allowed choice of a basic main dish and additions such as potato chips, soft drinks, and a special low-calorie milk drink. This milk drink was a reconstituted mixture of nonfat dry milk and a powdered, presweetened commercial mix. The commercial mix which we used was artificially fruit-flavored and vitamin C fortified.

In general, members of the group responded well. They were particularly impressed with the low-calorie milk drink. Most of them had not liked reconstituted nonfat dry milk to drink and were surprised to find that this mixture tasted so good.

Exercise came in swimming and other activities. Everyone was pleasantly exhausted and cups of the low-calorie milk drink were welcomed as replacement for the usual soft drink.

At the return clinic sessions, the group reviewed the lunches, counted the calories in each person's choices, and compared them to recommended amounts. Members were surprised to find for themselves that they could enjoy so many foods yet stay within reasonable calorie limits.

While no testing mechanisms were developed, the observable reactions of the group showed that some nutrition information had been absorbed. In our opinion the summer was successful and the terms "PRESCAD Cares" and "Give a Kid a Summer" became more meaningful to both the project staff and the young people who took part in the summer nutrition program.

Cholesterol in Foods

Cholesterol, one of the complex alcohols known as sterols, performs important functions in the body as an active metabolite within the cells and as a component of membrane structures. It is present in high concentrations in vital organs, with the highest being in the brain. Cholesterol comes from two major sources: body synthesis and foods of animal origin. Perhaps because of the methods used for its extraction and determination in food there has been a tendency to relate cholesterol content to the fat content. A critical evaluation of data shows, however, that reducing fat content frequently is not accompanied by a proportionate reduction in cholesterol. This paper provides an updated and expanded compilation of data on cholesterol content of foods. The sources that formed the basis for the values shown in Agriculture Handbook No. 8 have been reexamined in light of more current information.

Feeley, R.M., Criner, P.E. and Watt, B.K. Cholesterol Content of Foods. J. Amer. Diet. Assn. 61:134 (Aug.) 1972.

Genetics and Cholesterol Metabolism

It has been established recently that heredity plays a role in enabling certain animals, termed hyporesponders, to maintain normal cholesterol levels when fed diets containing cholesterol. Other animals of the same species, termed hyperresponders, respond to dietary cholesterol with markedly elevated plasma cholesterol. To better understand the mechanisms behind this phenomenon, a sterol balance study was performed with hypo- and hyperresponder squirrel monkeys. No difference was observed between the two groups in either the amount of cholesterol absorbed or synthesized. Control of the rate of conversion of cholesterol to bile acids, and the subsequent bile acid excretion, appear to be responsible for the ability of certain squirrel monkeys to maintain lower plasma cholesterol levels.

Lofland, H.B., Jr., Clarkson, T.B., St. Clair, R.W. and Lehner, N.D.M. Studies on the Regulation of Plasma Cholesterol Levels in Squirrel Monkeys of Two Geno-types. J.Lipid Res. 13:39, 1972.

Bile acids also play a basic role in serum cholesterol concentration. Part of the bile acids are reabsorbed from the intestines and are recirculated to the liver. As a result, they participate in control of their own synthesis from blood cholesterol and, possibly, in the synthesis of cholesterol itself.

An important function of cholesterol is as an intermediate in the biosynthesis of the steroid hormones—the corticoids, androgens, and estrogens. Although the details of the biosynthetic pathways are beyond the scope of this article, it should be mentioned that the corticoids, cortisol and aldosterone, are produced in the adrenal gland, and that cortisol, which gives rise to cortisone, is responsible for normal water distribution upon which normal blood pressure and renal function depend. Aldosterone is concerned with sodium retention by the kidney tubules.

The androgen, testosterone, functions in the development of secondary male sex characteristics in fetal life and during puberty.

The estrogen, estradiol-17B, is responsible for control of reproductive activity in the female. Progesterone and estradiol-17B function together in controlling normal menstrual cycle and the proper condition for maintenance of normal pregnancy.

By definition, a vitamin is an organic compound (other than essential amino acids) needed for some metabolic function but which, not being produced by the animal, must be ingested. However, one of the D vitamins, vitamin D_3, is produced in the skin from 7-dehydrocholesterol by the action of sunlight; 7-dehydrocholesterol, in turn, is a product of cholesterol metabolism in certain tissues. Thus another function of cholesterol is as the precursor of vitamin D_3.

A Significant Hypothesis

Studies are underway in the laboratory of the author to test an hypothesis that cholesterol in milk functions during the nursing period to develop mechanisms for the control of serum cholesterol concentrations later in life. Preliminary studies have shown that the pig is able to produce enough cholesterol to satisfy the needs for cholesterol discussed above. However, when cholesterol was withheld from suckling pigs, the addition of cholesterol to the diet of year-old pigs was not handled normally, and serum cholesterol rose to abnormally high levels.

In Summation

Cholesterol, far from being a useless or harmful substance, is an important metabolite, functioning as a structural, and possibly functional, constituent of some membranes and of soluble lipoproteins, and as the precursor of such divergent substances as sex and corticoid hormones, of vitamin D, and of bile acids.

About the Author

Raymond Reiser, Ph.D.

At Texas A & M University, Dr. Reiser's professional interests in animal biochemistry, nutrition, metabolism, molecular biology, and physiology, have earned him the title of Distinguished Professor and membership in the Research Council.

Dr. Reiser received the B. A. degree in biology from Western Reserve University and the Ph.D. degree in agricultural biochemistry from Ohio State University which honored him with their Centennial Award in 1970, the most recent of many honors. Active in numerous professional societies, he has also published more than 130 papers in technical journals and books.

Worth Reading

The Science of Nutrition.
By Marian Thompson Arlin.
New York: The Macmillan Company.
1972. $8.50.

The powerful role of nutrition is revealed in this book without submerging a reader in the depths of biochemistry. The author designed the text for students who want a background for appreciation of the subject but do not intend to pursue advanced study of nutrition. It is also stimulating reading for those now engaged in nutrition education, particularly because of its unusual balance between the physiology of nutrition and practical application in personal and world health. Instead of the traditional study of individual nutrients, the focus is on their involvement in the functions of body systems. Thus nutrition is interrelated with the natural concerns of people for their own potentiality.

The contents are organized in three major parts. The first part considers cells, their functions, how they obtain nutrients, and how each nutrient enters into the cellular processes that provide energy, growth, development, and maintenance.

In the second part, the physiology of each system of the body is outlined as a basis for understanding the relationship of its function and utilization of nutrients.

Where appropriate, controversial subjects that involve nutrient utilization are discussed with conservative judgment. Included are such widely publicized concerns as dietary factors in atherosclerosis and mental retardation, use of large supplements of vitamin A in acne therapy, and the preventive aspects of vitamin C for the common cold.

The last part of the book evaluates what is known about meeting nutrient needs. The explanation behind the Recommended Dietary Allowances and their application is followed by summaries of nutrition surveys in the United States, nutrient problems in food processing and fabrication, and factors of present and future food supplies for the world.

Fascinating diagrams and photographs enhance the verbal interpretations. A number of the comprehensive references and suggested readings that accompany the chapters may be unknown to many readers.

Nutrition News

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Diet Regulations for Caries Prevention

By James H. Shaw, Ph.D.
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Dietary regulations which promote the maintenance of healthy teeth throughout life must be emphasized in relation to the pre-eruptive and post-eruptive phases in the tooth's life history. The desired goals are to promote: (1) the formation of teeth which are histologically and chemically structured for endurance after they erupt into the oral cavity, and (2) the development and continuance of an oral environment around the erupted teeth which is unfavorable to the proliferation and rapid metabolism of microorganisms capable of destroying tooth substance.

The recommendations for dietary regulation that are made in this discussion are consistent with optimal nutrition for all the body. Though the teeth and their supporting structures have unique characteristics structurally and in relation to the oral environment, their nutritional needs are not different from or alien to the rest of the body.

Tooth Development. Human teeth form during a prolonged period. All primary teeth and some cusps of the secondary teeth begin to develop and mineralize before birth even though eruption occurs months or years later. These processes continue through the childhood and adolescent years and do not end until the third molars (wisdom teeth) erupt into the oral cavity and their root formation is complete in the late teens or early twenties. Like any other structure, the developing teeth require all nutrients to be supplied in adequate amounts.

A well-planned diet based on the general recommendations for the basic four food groups is optimal for tooth development when one addition is made. Typical distributions of foods do not supply adequate fluoride for optimal incorporation into enamel and dentin. Supplemental fluoride must be consumed throughout tooth development if a high resistance to caries is to be developed.

The fluoridation of public water to a level of 1.0 part per million (ppm) of fluoride is the optimal way to provide the appropriate amount of fluoride. This water introduces small amounts of fluoride into items consumed during tooth development, reducing caries by about 60 percent.

Many people, however, live outside a municipal water supply and many cities and towns have yet to supplement their water with fluoride. In these areas, effective levels of fluoride can be provided through proprietary sources such as tablets and drops. Unfortunately, the long period during which fluoride must be provided to each child requires much individual effort; few persons, even among highly educated and theoretically health-oriented population groups, seem to be willing to extend the effort for proper supplementation.

Many communities in this country now provide appropriately fluoridated water supplies. However, a concerted effort is needed to fluoridate the water of the municipalities where this has not been done.

Oral Environment and Tooth Maintenance. Dental caries results in the erupted tooth from the interaction of products of bacterial metabolism and tooth substance. The oral microorganisms known to cause tooth decay colonize the pits and fissures of the occlusal surfaces of teeth, the interproximal surfaces where the teeth touch each other and, under some circumstances, the smooth surfaces as well. These microorganisms require fermentable carbohydrates for their metabolism. The pits and fissures and the spaces between teeth are natural traps for food where microorganisms metabolize the food components to produce products which are related in amount and nature to the composition of the food. When the retained foods are high in fermentable carbohydrates, the microorganisms metabolize rapidly, producing sufficient amounts and concentrations of acidic products to destroy adjoining tooth structures. The more frequently food is trapped in these areas, the more frequently rapid microbial metabolism and tooth destruction occur.

Proper oral hygiene is important for the removal of food debris from the caries-prone areas. However, probably no oral hygiene system, even if practiced after consumption of every meal or snack, is adequate to remove all retained food. The selection of appropriate foods and the frequency of eating are additionally important factors in controlling dental caries after the teeth are formed and functioning in the oral cavity.

Many animal assays and clinical studies indicate that the caries experience can be greatly reduced if less sugar is consumed and if it is consumed less frequently. If the foods and confections which contain high amounts of sugar and which are retained in the mouth and particularly in contact with tooth surfaces were consumed less frequently or were eliminated from the diet, tooth decay in man unquestionably would decrease spectacularly. Many items which are consumed as in-between-meal snacks are likely to be problems. Note the popular snacks—often such choices as cake, cookies, and candy. The frequency of snack consumption plus the kinds of items consumed coupled with the unlikeliness of subsequent oral hygiene are cause for concern. Heavily sugared items such as frosted breakfast cereals and iced doughnuts also undoubtedly contribute to the high caries activity

Continued on Page 4

Caries-Free vs Caries-Active

Caries-free children were compared with caries-active youngsters in terms of diet, dental plaque, and oral hygiene. The 12- to 14-year old subjects were asked to enumerate the usual types of foods and beverages they ingested daily; the frequency of intake of each item was also noted. A staining technique was used to determine the extent of dental plaque. Oral hygiene status was evaluated using a previously established index. The caries-active children consumed more sucrose-containing foods and beverages and more between-meal and bedtime snacks than did the caries-free children. The caries-free subjects had a lower incidence of dental plaque and better oral hygiene. The importance of diet, dental plaque and oral hygiene as factors in the development of dental caries is underscored by these results.

Duany, L. F., Zinner, D. D. and Jablon, J. M. Epidemiologic Studies of Caries-Free and Caries-Active Students: II. Diet, Dental Plaque, and Oral Hygiene. J. Dental Res. 51:727 (May/June) 1972.

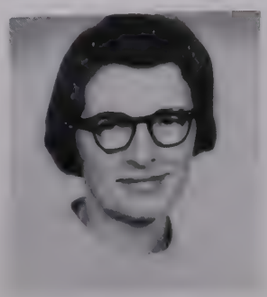
Periodontal Disease

There are striking similarities between human periodontal disease and experimental periodontal disease induced in animals by low calcium intake. Prompted by this observation, Dr. Krook and his associates conducted calcium therapy trials with ten human subjects afflicted with periodontal disease. Each subject was given 1 g of calcium daily for six months. Symptoms of bleeding gums and mobile teeth disappeared or were markedly reduced after calcium therapy. Also, mineral losses from the alveolar bone were reversed in seven of the ten patients. The results support the view that excessive resorption of the alveolar bone is the primary event in periodontal disease. Results also indicate that the alveolar bone resorption is caused by dietary calcium deficiency.

Krook, L., Lutwak, L., Whalen, J. P., Henrikson, P., Lesser, G. V. and Uris, R. Human Periodontal Disease. Morphology and Response to Calcium Therapy. Cornell Vet. 62:32 (Jan.) 1972.

Integrating Nutrition in Elementary Grades

By Evelyn J. Gray, Extension Nutritionist
The Ohio State University Extension Service, Columbus, Ohio



The Ohio Cooperative Extension Service program in Nutrition Education for Elementary Teachers developed from observations that some school texts still in use listed seven basic food groups and that many elementary teachers had little knowledge of nutrition. A series was designed to provide basic information on nutrition and food habits, to help teachers see ways to integrate nutrition into all subjects taught, and to seek ways to encourage participation in the school lunch program.

Topics proposed for five two-hour sessions were: 1) Food Needs at Different Ages, 2) Food Choices, 3) How Food Affects Development, 4) The School Food Service Contribution to Nutrition, and 5) How to Teach Nutrition Information to Children. Instruction at each session also allowed time to examine nutrition education materials selected from the bibliography of materials available at low or no cost. In the discussion to follow, teachers in grade-level groups could explore and share ways the instruction received could be used meaningfully in the classroom. The aim was to encourage integration of nutrition with other subject matter. The program was designed around a philosophy voiced by Dr. Mary M. Hill, Nutritionist, U.S.D.A., from experience with school food service:

Grades K-3:

"All food is good
I like food
Some food I have not yet learned to like."

Grades 4-6:

Raise questions about food and nutrition

Encourage pupils to find their own answers.

Give guidance in where to find answers.

In addition to the bibliography, a teaching guide for grades 1-6 was developed. The seven nutrition concepts from the White House Conference on Food, Nutrition and Health were phrased appropriately for grade level and nutrition-related activities.

Over the past two years, local education supervisors and county home economists in 25 Ohio counties have sponsored and recruited teachers for the in-depth courses. With minor local adjustments, the suggested pattern has been followed.

The first session, Food Needs at Different Ages, was designed to develop two concepts with teachers: the interrelationships of nutrients as they function in the body and the interrelatedness of basic food groups in providing nutrients. The four food groups were the basis just as they are in the materials in the bibliography. Teachers were helped to see how commonly-eaten combination foods fit into these four groups.

Subsequent sessions emphasized: family, neighborhood, and ethnic influences on development of food habits; research reports on nutrition in childhood and the later influence of childhood food habits; the school lunch—ways to increase appreciation of it and use it in teaching.

Teaching nutrition to children was built into each session. At the final one, an elementary educator correlated nutrition education techniques with education concepts. Each teacher was asked to report a way he or she had involved nutrition with subject matter already planned, or how a unit integrating nutrition with several subjects was planned. This report was part of the evaluation of the course. In addition, a rating scale devised for each session and using "like," "didn't like," and "could improve," rated the course high. Quality and quantity of ideas were found to be related to size and enthusiasm of groups.

These teachers have been an exceptionally receptive and cooperative audience. No credit has been given for the course and no in-service credits are allowed in Ohio, so teachers have come solely for self-improvement. They have been an inspiration.

A Nutrition Program in Housing Projects

By Marie Shefchik, Extension Adviser—Home Economics
University of Illinois Extension Service, Chicago, Illinois

The Robert Taylor Housing Development on Chicago's south side is the target area for 18 Program Assistants of the Expanded Food and Nutrition Education Program (EFNEP). Another 20 Program Assistants on the north side of the city work with families in the Cabrini-Green Homes.

The EFNEP, a U. S. Department of Agriculture funded program, is administered here by the University of Illinois through its Cooperative Extension Service. Started in Chicago in January 1969, the program seeks to upgrade diets of low-income families through education. Program Assistants work directly with families in areas of nutrition, food preparation, meal planning, shopping practices, sanitation, and related topics. They also offer information on agencies that can assist the family. The Program Assistants, full-time employees most of whom are recruited from the target area, must be able to identify and communicate with the family of low income.

The city's largest housing complex, the Robert Taylor Housing Development, includes 28 high-rise buildings of 16 floors each. Its population is about 27,000 with 77 percent children. Elevators in-or-out-of-order, stairwells, and objects falling from galleries are circumstances that require a team approach. Program Assistants visit homes in pairs, working out of two apartments used as Nutrition Centers in the complex.

With preliminary intensive training, augmented later at regular intervals, Program Assistants visit homes as neighbor to neighbor. Knocking on doors or using referrals from agencies, they teach what they have learned. Home visits may be on an individual or small group basis. After get-acquainted visits, the family is considered enrolled when the Program Assistant has taken a 24-hour food recall with the homemaker. This, plus information on income, food expenditures, education, and family size give clues to the help needed. The Program Assistant, her supervisor, and extension adviser together plan how to assist a family.

Periodically, homemakers are invited to a demonstration at the nutrition center. A simple, low-cost recipe is prepared, with accompaniments to make a meal. Cost and food values are explained and the food tasted.

Program Assistants work with an average of 40 homemakers at a given period. Most of them are middle-aged; others are senior citizens, teenage mothers, or young adults.

Since children often bring ideas to parents, Program Assistants work with children in clubs that involve preteens and teenagers as club leaders. Food preparation, games, songs, and crafts are used to teach nutrition informally. Program Assistants visit schools in the area to reach other children with the hope of enrolling new families in the program.

Materials used with homemakers and children are drawn from many sources: Extension Services; the Dairy Council and Milk Foundation; food industries; and visuals developed by the Program Assistants themselves.

Families move in and out of the program. The most frequent reason for leaving is change of residence; others are: loss of Program Assistant, lost interest, or a homemaker's job.

What kinds of change do we see in food knowledge and food consumption practices? Program Assistant records tell the story with reports such as: homemaker . . . is aware of more ways to include milk in meals; has learned new ways to fix vegetables; is using dry milk; has lost 10 pounds; uses recipes to have more variety in meals; shops herself now instead of sending children; plans meals from four food groups; makes shopping list; eats breakfast—feels better; manages so can buy more food; has improved in housekeeping.

Children, through club meetings, have gained skills in food preparation and ability to work together.

Fluoride and Dental Health

Studies in widely differing geographical locations have shown the beneficial effect of fluoride in reducing dental caries in children. The present study conducted in Great Britain indicates that the beneficial effect of fluoride on dental health persists throughout life. Tooth loss was determined by age in Hartlepool, a natural fluoride area, and York, a low fluoride area. Throughout the whole age range studied, the mortality of each tooth type was lower in Hartlepool than in York. Thus even in an area with one of the lowest dentist-to-population ratios, the presence of 1.5 to 2.0 parts per million fluoride in drinking water resulted in a lower incidence of caries, a lower tooth mortality, and a smaller need for partial dentures compared with a low fluoride area with one of the most favorable dentist-to-population ratios in the country.

Murray, J. J. Adult Dental Health in Fluoride and Non-fluoride Areas. Part 3.—Tooth Mortality by Age. Brit. Dental J. 131:487 (Dec.) 1971.

Nutrition Counseling

Individualized nutritional guidance for the caries-susceptible adolescent is an important part of preventive dentistry. Evidence shows that food and nutrition are involved in the interactions that cause dental caries. Sucrose is the major carbohydrate responsible for initiating and spreading dental caries. Frequent consumption of retentive sweets tends to enhance the cariogenicity of sucrose. On the other hand, resistance to dental caries can be improved by nutrients such as fluoride, phosphate, and protein. Helpful also is a diet which promotes clearance of food in the mouth. The food habits and attitudes of adolescents must be dealt with on an individual basis. The most cooperative patients are those who, with proper motivation and guidance, actively participate in the counseling.

Nizel, A. E. and Shulman, J. S. The Science and Art of Inhibiting Caries in Adolescents Via Personalized Nutritional Counseling. Dental Clin. North Amer. 13:387 (April) 1969.

in our populace. While high amounts of sugar are consumed in sweetened drinks, tea, and coffee, these sources are readily cleared from the mouth and may not be as serious with regard to tooth decay as the same or lesser amounts of sugar in items which are retained more readily.

At present, insufficient research has been done to give exact cariogenic ratings to foods and confections. A new era of emphasis to collect this kind of data is underway as a result of Congress funding the National Caries Program—an effort to bring information from the research laboratory and clinic to bear for prevention of dental caries in our nation.

For the present we have to generalize from available data in designing the following dietary recommendations: for optimal oral health the diet for child, adolescent, or adult is to be based on thoughtfully planned menus developed around the basic four food groups. Snacks, when consumed, should emphasize fresh fruits and vegetables, cheese, nuts, and similar items which are not readily retained on tooth surfaces and which have low levels of fermentable carbohydrates. No clinical data are available to support the often heard claims that raw sugar, brown sugar, honey, and maple syrup are any less cariogenic than products with comparable amounts of refined sucrose. Oral hygiene must be practiced faithfully, especially after highly cariogenic items are consumed.

No convincing data are available to indicate the extent to which the desire for numerous sweet items is attributable to an acquired taste developed in infancy and childhood. Certainly with the heavy usage of sugar in the preparation of baby foods and many foods where the added sugar is not an essential for preservation or even for a good natural taste, we are conditioned throughout life to sweeten foods more than is nutritionally desirable.

The 100 or more pounds of sugar available on the average annually for consumption by each individual in the United States represents about 3600 calories per person per week. Surely no one seriously doubts that this is too high, not only for maintenance of normal teeth, but possibly also in relation to diabetes, heart disease, and weight control. Yet we are barraged by attractive and not so subtle advertising that sugar isn't just good flavor; it is quick energy food. It provides only fermentable carbohydrate that yields calories.

Prompt help is needed from the food processors and from their advertising agencies to reduce the sugar content of a wide range of foods, to develop snack items which are tasty but lower in fermentable carbohydrates and retention characteristics in the oral cavity, and to advertise them more discerningly. Probably the biggest nutritional absurdity of our day is the increasing use of enriched "cakes" for feeding programs in school breakfasts and lunches.

In summary, for maximal reductions in dental caries, optimal diet and fluoride consumption are necessary during tooth development plus dietary regulation after tooth eruption to reduce the amount and frequency of food and confectionary items containing sugar. Fluoridation without dietary control and vice versa are only partially effective measures. Neither procedure replaces the other. They supplement each other.

About the Author

James H. Shaw, Ph.D.

Dr. Shaw's interest in and contributions to dental medicine are attested to by his association since 1945 with the Harvard School of Dental Medicine where he is now Professor of Nutrition. Among his many activities, he has twice served as a member of dentistry committees of the National Research Council and is currently on the Committee on Nutrition Education in Schools of Dentistry, International Union of Nutritional Sciences. In addition to membership in several professional organizations including charter membership in the Society for Nutrition Education, Dr. Shaw has published numerous professional papers.

Worth Reading

Food, Nutrition and Diet Therapy. By Marie V. Krause, B.S., M.S., R.D. and Martha A. Hunscher, B.S., M.Ed., R.D., M.R.S.H. Fifth Edition. Philadelphia: W. B. Saunders Company. 1972. $9.75.

The authors' design in presenting this book's up-graded information at a "level of sophistication that will meet the needs of students presently entering the nursing and other health professions" also makes this valuable for practicing health professionals.

The presentation of controversial matters is conservative and well-documented. Throughout the text, the discussions relate to the "individual as a member of a community . . . and particularly in terms of the meaning of change in behavior needed to improve dietary habits and the process through which learning takes place."

Part One of this 3-part book discusses nutrients, the adequate diet and food economics, nutrition and community health, and nutrition in the life cycle. One chapter deals with teaching techniques; another, with geographic and cultural dietary variations, presenting food plans of 21 nationalities. In the chapter on pregnancy, an emphasis is on diet in preparation for pregnancy with its influence on reproductive efficiency.

Part Two deals with the role of nutrition in prevention and treatment of disease. Therapeutic dietary modifications include those for febrile and gastro-intestinal diseases, metabolic disorders, cardio-vascular and renal diseases, and diseases of infancy and childhood including disaccharide intolerance. The objective unit on cardio-vascular diseases quotes studies by Drs. Scrimshaw, Fredrickson, and Sebrell. The meal plans for hypercholesteremia and hyperlipoproteinemia are those formulated by Dr. D. S. Fredrickson in a Handbook for Physicians, the National Heart and Lung Institute. The fat-controlled diet patterns use food exchange lists of the Council on Foods and Nutrition of the American Medical Association.

Part Three deals with foods—their composition, uses, availability, nutritional value, and digestibility, centered around the four food groups.

Nutrition News

APRIL 1973 VOL. 36, NO

Teaching Nutrition with a Focus on Values

By Jack D. Osman, Ph.D.
Associate Professor, Health Science Department, Towson State College
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Nutrition educators have done a commendable job in sorting out the reliable research and transmitting that information to their students. Some nutrition educators erroneously believe that since they have presented the facts of nutrition (especially if they have presented controversial points of view) that they have fulfilled their didactic duties.

An emphasis on the scientific-factual-research approach tends to minimize the psycho-social-humanistic aspects of nutrition education. As trite as it may sound, educators must remember that their goal is to produce well adjusted, rational people who can think as well as relate and feel, not just nonlinear, calculating computers.

One of the ultimate objectives of education is to be able to make intelligent decisions based upon the best knowledge available, to live in congruence with what a person knows. Syllogistic reasoning would suggest that those who know the most should behave the best. Yet the world is filled with persons who know much better than they do. The overweight dietitian knows that excessive weight is harmful to her health but she still leads a hypokinetic-high-calorie life. Such behavior could hardly be described as "rational" or "intelligent" or as the kind of behavior that characterizes truly educated people.[1] Perhaps knowledge is not as simplistically related to attitudes and behavior as educators once thought. We need to go beyond just disseminating knowledge. Even the Basic Four and conceptual approaches have recently been criticized as being "inadequate to accomplish the desired results in nutrition education."[2]

Facts and concepts can still leave students cold; they seem abstract and impersonal. What is needed is a personal "you-centered" approach based, in part, on the here and now of reality. The scientific approach needs to be tempered with a values-level application of the specific facts and general concepts. The values level is characterized by lifting and transforming both information and concepts to a personal "you-centered" level. This level adds meaning and relevancy to the facts, thereby increasing the possibility of their application to the student's life.[3]

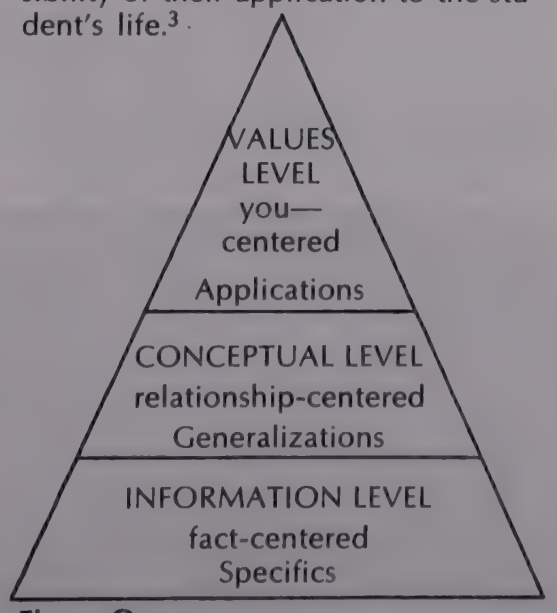

Figure One

We need to assist students in clarifying what all the content and concepts mean to them at that point in their lives. As Figure One suggests, facts and concepts provide a base for effective thinking, but it is our values, in the final analysis that ultimately determine our behavior. In short, facts are needed to inform our values.[3]

Values are like stars that guide our lives. Some people freely choose to follow certain values, others choose different values (life patterns) that have meaning for their lives at that point in time.

Students should be educated as to the alternative nutritional values open to them. Students need to choose freely those nutritional values which have meaning for them at that point in their lives. Some educators, however, feel that the only values worth mentioning in a classroom are the ones that can be stamped in, indoctrinated, moralized, inculcated, or rammed down kids' throats.[4]

Often in life, things (situations, circumstances, problems, conflicts) obfuscate or cloud our vision of the choices open to us. We can no longer see clearly those values that guide our lives. At times like this we need someone to blow away the clouds. Instead of teaching his own values, the teacher should assist students in the process of seeing and following their own values.

Within this "value-clarification" process the educator acts as a facilitator, not a dictator. This involves going through a well-thought-out series of steps and teaching strategies which confront, clarify, and challenge students to put into practice what they have learned. A seven-step process of valuing defines value clarification and collectively characterizes the person who uses his values to guide his life.

Choosing: 1)freely; 2) from alternatives; 3) after thoughtful consideration of the consequences of each alternative. *Prizing:* 4) cherishing, being happy with the choice; 5) willing to affirm the choice publicly. *Acting:* 6) doing something with the choice; 7) repeatedly, in some pattern of life.[5]

A series of teaching strategies have been developed to assist the student through each of the seven steps of valuing. Several nutritionally oriented examples follow, adaptable for various age of information levels.

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Nutrition and Weight Dual Continuum

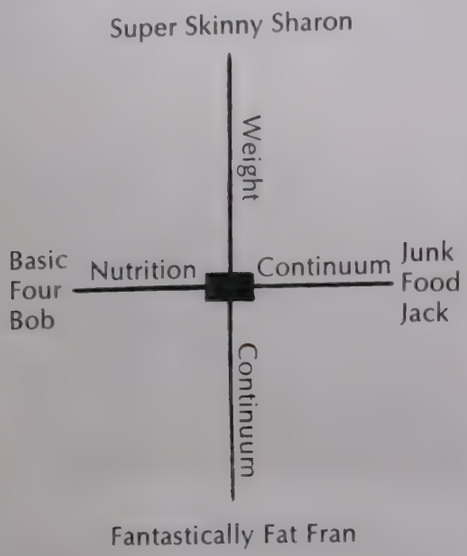

Figure Two

A self-image evaluation strategy (diagramed in Figure Two for enlargement) sets up the wild extremes in an attempt to help students identify other alternatives. They are asked to mark their position but to avoid the middle of the road. The teacher should explain each continuum as follows. Basic Four Bob refuses to eat anything unless the meal has been balanced by at least one food from each of the four groups. Pizza with meat or pepperoni would be acceptable, so would a cold cut and cheese submarine sandwich. Junk Food Jack is oblivious to any sound dietary practice; food selection is based on the sweet tooth syndrome. Jack refuses to eat a balanced meal because all those foods and nutrients at the same time would play havoc with his digestive process.

On the vertical weight continuum Super Skinny Sharon would be the classic 1-1-7 ectomorph who almost disappears when she turns sideways. Fantastically Fat Fran is the female counterpart of Bill Cosby's "Fat Albert," a pure 7-1-1 endomorph.

Adequate class time should be given to follow these directions:

1. Mark the horizontal line with an "X" at the spot which best approximates your food selection practices. Do the same for the vertical line in reference to your present weight. Plot your position on this dual continuum by extending both "X's" until they meet.

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"Ono Nutro"—A Nutrition Education Project with a Future

By Audrey Maretzki, Assistant Professor
Department of Food & Nutritional Sciences, University of Hawaii

*Ono Nutro,** a uniquely Hawaiian menu book for college students, is an attempt to provide a meaningful nutrition learning experience for Introductory Nutrition students. *Ono Nutro* originated in response to a student suggestion that small groups be permitted to work on a class project relating to food problems which college students face.

Through their participation with *Ono Nutro,* the students achieve many class learning objectives including experience in planning nutritionally adequate meals on a limited budget, appreciation of cultural influences on food choices, and improvement of communication skills.

At the beginning of the course students with different ethnic backgrounds, academic majors, and food preparation experience were divided into groups of five. Every group is required to produce a day's menu which must meet, but may exceed, the 18-to-22-year-old woman's Recommended Dietary Allowances. Realizing that university students have a diversity of food habits, the group plans menus which they feel will appeal to a selected target audience within the university population — usually themselves. Menus with accompanying recipes, informational "chatter," and original illustrations will eventually become part of the class' project.

Ono Nutro does not end when a group has planned a nutritious menu which students can afford, written the text, and produced the illustrations. An essential feature of *Ono Nutro* is an inter-group exchange of menus and a preliminary preparation and evaluation of the recipes.

For the finale, each group presents its own menu to the entire class for sampling and rating. Their menu, however, has been prepared by yet another group of students. In its presentation a group is expected to explain to the class how and why the members selected the menu, and the nutritional value of the menu. The instructor and classmates raise questions and make comments and suggestions which often lead to revisions before a group submits its *Ono Nutro* contribution for final grading.

All menus, recipes, et cetera are distributed to the class.

The first semester that *Ono Nutro* was a class project (spring '72), students volunteered to help edit and index the recipes and plan a layout. The sixteen menus were then printed as *Ono Nutro I.* Copies of *Ono Nutro I* were distributed to students and to nutritionists and home economists in the community who, we felt, might find it useful in their nutrition education activities.

A possible use of the menus for comparing the cost of purchasing a nutritionally adequate diet in various markets was suggested by an economist of the Hawaii Department of Agriculture which publishes a weekly food price survey. Using seven days' menus, including market orders, surveyors can price a week's menus. A computer analysis can provide Hawaii's consumers with information to help them serve nutritionally adequate meals for the lowest possible prices.

The *Ono Nutro* project was the topic of a feature article by a food editor of a local newspaper. When requests for copies of the book resulted, they were discussed with students. The student council of the Department of Food and Nutritional Sciences was able to receive funding to produce and sell *Ono Nutro I* as a community service project. *Ono Nutro II,* the Best Menus of '72-73, is scheduled for summer '73 release.

Ono Nutro I will be sold for 50¢ at the University Bookstore, Student Health Center, health food stores near campus, and for 75¢ by mail from the Food and Nutritional Sciences Council, 2515 Campus Road, Honolulu, Hawaii 96822.

***Ono: tasty in Hawaiian; Nutro: nutritious**

Teaching Nutrition
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Weight Control Program: Elementary Students

By Michael D. Miller, Physical Education Teacher
Parkrose Public Schools, Portland, Oregon

The overweight child is severely handicapped physically, socially, and emotionally in comparison with his peers. With these deterrents, school can be a traumatic experience. One might assume that the overweight child who really wants to compete with other children will lose weight. It is not that simple. There may be many reasons for the overweight. The condition may be due to poor eating habits, to physical inactivity, or to both. Sometimes psychological factors are involved. At times the problem is physiologically based. Yet we should make the effort to try to help these young people become more aware of their individual potentials and find ways to work with them toward solving their weight problem. We feel we have moved in that direction with a weight control program we have established.

Mrs. Rachel Hayes, community health nurse assigned to the school, and I designed a pilot program based on the philosophy that proper nutrition and physical activity are equally important in controlling a child's weight. To achieve our goals we needed cooperation of school and home.

Our program began with the health checks administered by the P.T.A. each fall. From this data, Mrs. Hayes screened the overweight children, using the A.M.A.-N.E.A. height-weight-age charts. The child in grades 3-6 outside a set weight range was identified as needing help.

A notice outlining a weight control program to begin at school was given to faculty, students, and parents. Follow-up letters were sent to all parents of those children identified as being overweight. The letter described in detail the activities of the program and asked parental consent of those who wanted their children to participate. We recommended a physical examination for all participants and a local doctor administered the examinations at school when requested.

The program was developed mainly around two activity periods per week, held before and after regular school hours. A 40-minute period involved classroom instruction in the basics of nutrition and physical exercise, using such teaching methods as discussion, films, charts, and student presentations. We found that students in grades 3-6 combined well together when individual guidance also was incorporated. Basically, we tried to make students more aware of what they ate and should eat in order to help themselves. Each child kept his own weekly weight record.

The second weekly period was a 50-minute session of physical activity, individualized to maturation differences as much as possible. It involved exercises from which some students made up their own routines. Students engaged in such activities as hockey, tumbling, relay racing, and softball.

Of the 18 children who participated through the school year, about one third lost weight, one third stayed the same, and the last third gained a little weight. This we considered real progress toward the goals set for children. The primary goal was no weight gain by the overweight child during this time. The secondary goal was that the child lose a predetermined amount per month. If the child met either condition, we felt he made a goal. Though the overweight child may not lose weight, he achieves measurable success when he does not gain as he grows taller.

It is rewarding to see the improvement in attitude about themselves that most of the children attain. Yet, it is discouraging to try to meet the varying needs of the different children. There are problems, too, in some cases, in arousing parental concern. One needs the support of parents to make a program effective.

If we are to help the overweight youth constructively, we ought to begin to deal with the condition in the elementary school years. Proper nutritional and physical activity patterns should be developing.

2. Find someone else in class in the same general area (quadrant) as you. Talk to them about their food selection practices. Ask them to honestly evaluate your build and rate your weight. Can you come to an agreement?
3. Where would you *like* to be on this dual continuum? Mark that spot with an "O." Is there a significant difference between where *you* are now and where *you* would like to be?
4. If you are not happy/satisfied with your diet and/or weight, what do *you* plan to do about it?
5. Contract with yourself, in writing how *you* plan to make a concerted effort to improve your nutritional behavior. Sign and date the contract. Share its meaning with someone in the class.

Ten Foods I love to Eat and Drink

Have the students list their 10 favorite foods on paper. Explain that the following coding means nothing as such. It's only a means of self-evaluation.

- Circle the food you could most easily do without for one year.
- Mark a plus (+) next to each food that's relatively high in nutrients.
- Indicate with a dash (—) those foods high in calories and low in nutrients.
- Star (*) those foods low in calories.
- Use a (#) to code those foods you eat too much of and/or too often.
- Use (5) to show foods that would *not* have been on your list 5 years ago.
- (X) for junk foods or empty calories.

Ask students to write answers to the following three questions on the back of their worksheet after they objectively study their codings:

1. What did the "Ten Foods" exercise reveal to you about your food selection?
2. Are all of the food groups represented? In balanced amounts?
3. What, if anything, do you plan to do as a result of the exercise?

As is customary in value-clarification strategies, the students' worksheets are shared with no one (including the teacher) unless a student so chooses. In this way they are more likely to be honest with themselves.

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Some students may be anxious to share something they have learned about their food selection from "Ten Foods." Therefore a good follow-up strategy is the "I learned . . . ." completion statements. Students voluntarily complete them in the 3 to 5 minutes allotted.

Value Voting

This strategy helps elicit responses from the entire class. It encourages students to take a stand on what they believe is right at the same time it reveals pertinent information about what students know and do not know. The voter has five alternates. (1) A raised arm with the thumb up indicates being in favor of the idea. (2) Thumb down reveals opposition. (3) If you don't know, don't care to reveal your answer, or if you're not sure, you indicate *any* of the three by folding your arms. (4) If you're really in favor of or for the idea, wave your raised arm with thumb up. (5) To register strong disapproval, move your thumb down as if stirring something. Here are some sample voting questions to "How many here. . . ."

- Take therapeutic doses of vitamin C to prevent or cure colds?
- Drink at least three glasses of milk a day? Four?
- Feel increased activity is very beneficial in weight reduction programs?
- Believe excessive sucrose may lead to heart disease?
- Regularly follow the Basic Four Food Groups?
- Think pizza is a junk food?
- Consciously limit *your* cholesterol intake?
- Strive for 50% of your fats to come from polyunsaturated sources?
- Believe potatoes are fattening?
- Feel *you* have a weight problem?
- Eat potato chips regularly?
- Drink at least one sugar-containing soft drink a day? Two? More?
- Drink skim or two percent milk?
- Believe *you* suffer from lactose intolerance?
- Think your nutritional patterns will change as a result of this course?

After reading about five questions aloud to the class it's advisable to ask, "Does anyone want to ask anyone else why they voted a particular way?" Teachers should join in the voting fun, but with a brief delay so as not to sway students who are easily influenced.

Value Ranking

Ranking gets at priorities. Priorities reveal values. Value discussions often bring out inconsistencies, faulty reasoning, misinformation, or new information. Ask students to rank order three or four items. The variations in answers create interesting discussion.

1. Rank as most nutritious:
   Instant breakfast with water
   Salted peanuts
   Pizza with pepperoni
   Orange drink with a B-complex pill
2. Rank food with most calories first:
   Medium-sized baked potato
   Nine potato chips
   Extra large apple
   Ten celery stalks
3. Rank drink with most calories first:
   Beer, 8 oz.
   Whole milk, 8 oz.
   Skim milk, 8 oz.
   Cola drink, 8 oz.
4. Rank as most reliable source of weight control information:
   Dietitian
   Magazine ad
   Pharmacist

Many more value-clarifying strategies can be easily adapted for use within nutrition courses. [5, 6] Personally, I have used the above strategies and feedback from students indicate that these are efficient, effective, and satisfying didactic techniques.

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About the Author

Jack D. Osman, Ph.D.

As a health educator with a minor in nutrition Dr. Osman's concern for effective nutrition education led to his Master's thesis "Nutrition Misconceptions of College Freshmen." His 1971 doctoral dissertation at Ohio State University and his extensive current writings deal with value clarification strategies in the health curriculum.

Worth Reading

Conference on Guidelines for Nutrition Education Programs, Williamsburg, Va. June 25-27, 1972. American Medical Association, Chicago. Available for postage, 25 cents.

The findings of 87 invited participants at a conference on the elusive subject of nutrition education in schools of medicine and related fields are reported. The Conference was organized by AMA's Council of Foods and Nutrition with the support of HEW's Nutrition Program of the Center for Disease Control, the American Heart Association, and The Nutrition Foundation, Inc. All participants, a notable group, are identified in this report.

The assembly was a follow-up to one held in 1962, but scant progress was outlined as this Conference opened. Later, it did appear that several medical schools had increased training programs in nutrition, though often not so designated. Nor was there agreement that such identification was important in the nomenclature. This report covers the discussions of this and other controversial matters, including crowded curricula, meager career interest, and funding.

Here, too, are guidelines from the four workshops. Their nine specific recommendations may seem almost unreachable goals, but they are flexible ones. Despite the conflicts, there is advancing recognition of nutrition as vital in medical education and urging that nutrition research be broadened and increased.

Nutrition News

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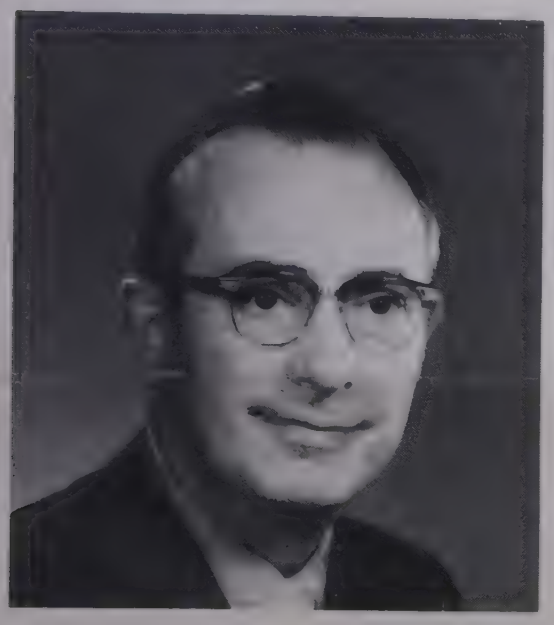
The Perfect Environment for Nonsense



By Philip L. White, Sc.D.
Director, Department Foods and Nutrition, Secretary, Council Foods and Nutrition
American Medical Association

Peer review, the evaluation of one's accomplishments by his associates, is vital in the scientific community whether it be a seminar presentation or an article submitted to a scientific journal. The scientist expects and usually welcomes review of the material prior to its acceptance. Peer review assures the accuracy and reliability of the data or methods used to obtain data.

On the other hand, the nutrition quack neither expects, desires nor receives review by his peers. Have you ever heard a nutrition fanatic take exception to the offbeat nonsense expounded by another fanatic? Nor have I. When a scientist or educator challenges the statements of a charlatan the response is not "let me check my references" or "permit me to rethink that issue." The reliability or the research funding of the challenger is attacked as though to discredit his right to inquiry. When you ask a quack for references the reply may be "You'll be hearing from my lawyer."

Such is the environment of nutrition nonsense today. The absolute lack of peer review, permitting the most irresponsible of statements, has neatly confused important issues for the interested public. Within this environment it is easy to become a self-styled expert. All that is needed is a cause, verve, and a microphone or publisher —preferably a publisher who has no qualms about publishing unscientific material and who condones false advertising of his books.

The public and the mass media of communications seldom challenge the credentials of the self-styled expert. To some extent, this is understandable since some of the experts have impressive degrees such as Doctor of Medicine. Unfortunately some extremely bad books and newspaper columns have been written by holders of that degree. Professional and scientific organizations can assist the media by helping to determine whether an "expert" is speaking from a base of training and experience or emotion and hearsay. Such organizations can attest to the credentials of those who claim authority. The Chicago Nutrition Association with the American Medical Association has published reviews of books on nutrition classified as recommended and not recommended. Book reviews constitute one form of peer review. Peer review or evaluation of credentials should be expected as a routine measure by the media, but as we shall see the media marches to a different drum.

The general tendency of the public is to accept bits and pieces of information, and to clutch at promising preliminary research. A hunger for new medical breakthroughs makes the public easy prey for the self-styled expert. The "expert" plays these interests for all they are worth. Witness the fantastic interest in vitamin E. There is essentially no evidence that it is of any value in amounts about 25-50 mg, yet people are consuming vast quantities at great expense to their wallets but no added benefits to their health.

Much the same situation prevails with vitamin C. Dr. Linus Pauling has challenged the conclusions of several studies showing negligible effects of vitamin C on the incidence or severity of the common cold and issued his personal recommendations for mega doses of the vitamin. On the basis of his testimonials millions of people are spending lots of money taking part in a mass, but uncontrolled experiment.

The fury of the ecology movement, the earth days of a few years ago, and the anti-establishment mood of our young people, led directly to a meteoric shower of nonsense and condemnation by innuendo. Anyone angry enough to become involved joined in the general uninhibited condemnation of nitrate fertilizers, DDT, food additives, white bread, processed food, feed lot finishing of livestock and more. Out of this fury, fanned by immature faculty members, emerged a great distrust of the establishment—big business, the government, medicine, and academia itself. All of which played right into the hands of the nutrition fanatic. Health food people capitalized on the whole mess by featuring the organic bit while themselves smearing food science, the food industry and the medical profession.

Although anti-intellectualism and anti-establishmentism are on the wane as students become more conservative, the effects of these movements are still being felt. The problem is that as the credibility of the scientist, the food industry and the medical profession have been undermined, those best equipped to set the nutrition record straight have been made to appear suspect. Qualified nutrition scientists are accused of being tools of the food industry or so protective of their National Institutes of Health research grants as to have lost their sense of objectivity. The accumulation of chipping and whittling at our institutions has had a serious effect on credibility.

Why is nutrition nonsense so lucrative a non-profession? Why are we faced with one bad diet book after another? How can fallacious authors rise to national prominence as on fatty clouds almost over night? Why? Because the media of mass communications ignore peer review and pro-

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Diet Revolutions

The Food and Nutrition Council of the AMA (American Medical Association) points out that no reliable mechanism exists to help the public evaluate the great volume of nutrition information and misinformation published. The media, publishers, and authors have a unique responsibility to ensure that such information and advice are based on scientific facts from responsible research.

As an example, the diet recommended in the recent book "Dr. Atkins' Diet Revolution" is neither new nor revolutionary. It can be hazardous to the health of some obese persons who reduce carbohydrate intake to less than 40 grams daily while eating large amounts of fats and proteins. The Council urges physicians to counsel their patients as to the potentially harmful results that might occur on such a "ketogenic diet."

The statement of the AMA points out that the existence of a "fat-mobilizing hormone" remains unproven. All available biochemical evidence indicates that the even-numbered carbon chain fatty acids stored in adipose tissue triglycerides cannot be used for appreciable net synthesis of carbohydrate. In addition, any "unlimited" intake of saturated fats and cholesterol-rich foods may induce in some persons elevated plasma lipids which may be a risk factor in coronary heart disease.

The Council further states that no evidence is cited to validate the observation that weight can be lost by sedentary subjects who consume a carbohydrate-poor diet providing 5000 calories per day.

In reviewing such grossly unbalanced diets which would necessitate a life-time change in eating habits to maintain long-term weight reduction, the Council reminds the public that no weight reducing diet can be effective unless it provides for a decrease in energy intake or an increase in energy expenditure.

AMA Council on Foods & Nutrition. 1973. A critique of low-carbohydrate ketogenic weight reduction regimens —a review of Dr. Atkins' diet revolution. JAMA. 224:1415 (June 4).

F.I.T. For Action in Nutrition

By Ann Barton, R.D., Area Coordinator for Expanded Food and Nutrition Program, Cooperative Extension Service, Pennyrile, Kentucky

Today's public needs accurate nutrition information. A community information team to coordinate the efforts of many organizations in promoting nutrition education was a brainchild of two perceptive individuals.

The result was the Lexington, Kentucky, Food Information Team (F.I.T.) which evolved as an organization through which health professionals could share their knowledge and ideas to more effectively and efficiently inform the public about nutrition.

The first meeting of the Food Information Team, attended by representatives of twenty to thirty agencies, was held in April, 1970. Presently about twenty active organizations and numerous individuals participate in the Food Information Team. Among the organizations represented are the Dietetic Association; the Adult Education Program; the Expanded Foods and Nutrition, 4-H and adult programs of the Cooperative Extension Service; the School Lunch Program; Head Start; university and area hospitals; the Dairy Council and consumer-oriented groups.

F.I.T. monthly meetings vary in format and content. Sessions include coordinating efforts, and "eye-opening" or sharing, to update members on timely activities or topics related to nutrition.

The Food Information Team's activities make scientifically-based nutrition information available to the entire community. One of F.I.T.'s first projects was publishing a newsletter, "Nutrition Notes," for food stamp recipients. Fifteen hundred copies are distributed monthly by nutrition assistants in the Expanded Foods and Nutrition Program at points of food stamp distribution. Each newsletter focuses on one general theme such as how to buy foods or food storage. The newsletter is coauthored by four persons on a rotating basis.

The Food Information Team sponsored radio spot announcements for a period of about six months. One-minute public service announcements were also aired on television. Members of F.I.T. have appeared on television talk shows and the radio program "Sound Off." During this program, listeners called the radio station to ask questions of the participants.

One of the most successful activities of the Food Information Team is a weekly newspaper column, "Foods to Fit You." The column is written on a specific topic of immediate interest to the public such as "Children's Food Habits," or "Vitamin E—How Good Is It?" Readers may send questions to F.I.T.'s post office box. All reader questions are answered either in the newspaper column or personally—by phone or through a home visit. Questions and problems are referred to the individual or organization which can best be of service.

F.I.T. is registered with the Volunteer's Bureau to be available to present nutrition education programs upon request. In addition, F.I.T. has sponsored booths at fairs.

The Food Information Team has been an asset to the Lexington community in its first three years. It conceives greater opportunities to promote good nutrition in the future. A Speaker's Bureau is just one possibility for the future. This service would make available a list of speakers and their topics to organizations which would be interested in having programs about nutrition. F.I.T. anticipates sponsoring a professional conference on nutrition with an open invitation to the community.

With its many talented people, the Food Information Team has tremendous resources for disseminating accurate nutrition information. F.I.T. is providing needed community service to health professionals and to the public.

Facts--Not Fads for the Listening Public

By Sheila E. Henderson, R.D., Director, Nutrition Section, Division of Medicine
Lutheran General Hospital, Park Ridge, Illinois

Nutrition is a "hot" subject right now—the public is more "aware" of nutrition's existence but what kind of information are they receiving? Unfortunately, the public interest is captured by the flamboyant authoritativeness of the controversial faddist.

The Illinois Dietetic Association Executive Board, in response to membership concerns arising from a nationally syndicated radio program, wrote to the general manager of the local affiliated station. The letter protested not only the nutrition misinformation but also the borderline insinuations, contrary to scientific evidence, which were being broadcast. The services of the Association were offered to present "scientifically sound nutrition advice which would better meet the health needs of the public."

The manager's brief reply assured us that the station's role was to present all sides of controversial issues, letting an informed public make intelligent decisions, and thanked us for our concern. Our response agreed wholeheartedly with his statement, but questioned their fulfillment of this role since the other side was not heard in rebuttal to the original broadcasts.

Our position was supported by letters and phone calls from our membership and physicians. Perseverance, aggression, and group support resulted in a firm offer of public service time with the understanding that this time would be utilized to present ethical nutrition information rather than for direct attacks on the perpetrators of misinformation. We planned to offer five 90 second reports a week to be played two or three times per day as a public service from the Illinois Dietetic Association at no charge.

A committee was assembled to brainstorm for title, format, content, and procedures. Arrangements were made with our hospital audiovisual department to record the original tapes. An editing committee was appointed to follow through on our promise to move nutrition education out of the "dull and drab" category, to assure the validity of the information being offered, and to avoid duplication. A question and answer format was chosen. Scripts were to:

A. Get the attention of listener
B. Give the listener *one* idea
C. Move the listener to action (or at least thought)
D. Reach the widest possible audience through varied messages.

An audition tape of five messages was submitted to the station for critique. The station replied, "It is entirely acceptable and does the job we both want it to do." This report was received four months after initiation of the original letter. Three months following acceptance, "Nutrition I.Q." was on the air.

Material and production cost is negligible compared to time involvement. Each 60 second nutrition message is approximately 160 words. A standard opening and closing uses an additional 30 seconds. Writing and editing the scripts, recording, editing the recorded tapes, delivering to the station, and answering mail and phone questions involves five or six people and about fifteen hours per week.

There is difficulty in enticing the membership to submit suitable scripts, even though they may answer similar questions daily. Our planned alternative is a writing committee which will utilize suggestions from the membership and the listening public in developing final copy.

"Nutrition I.Q." has survived its first six months, listener response is increasing, and the program we originally protested is off the air for lack of a sponsor!

The "New" Vegetarians

Diet and related aspects of life-style were studied in 100 young American adult volunteers who were vegetarians, but not Seventh-Day Adventists. The subjects reported a wide spectrum of food avoidances.

The "new" vegetarians comprise a diverse group, ranging from semi-vegetarians who avoid only certain animal foods to vegans who avoid all animal foods and a variety of non-animal foods.

All weighed less than their maximum adult weight. Weight loss was greater and weight-for-height lower among men than women. Weight loss was greatest among men with extreme animal food avoidance patterns. This latter group (vegans) represent a potential risk of inadequate sources of vitamin B_{12} and high-quality protein.

A large portion of the subjects felt that conventional nutritional standards were irrelevant and did not consider philosophical or esthetic qualities vital in diet selection. Others accepted the findings of nutritional science, but differed in the interpretation.

Dwyer, J. T., Mayer, L. D. V. H., Kandel, R. F. and Mayer, J. 1973. The new vegetarians. J. Am. Diet. Assn. 62:503 (May).

Cost of Health Foods

Health and traditional foods (24 of each) were compared for proximate composition, cost, microbial content, pesticide levels, and contamination with PCBs (polychlorinated biphenyls —chlorinated breakdown products of industrial waste). Only minor differences were detected for proximate composition and microbial content. No pesticides were detected, however seven samples of health and three of traditional foods contained PCBs. This was unusual and illustrated that the label "health" does not guarantee freedom from environmental contaminants. The major difference was a 1.7 times greater average cost for the health foods. Although this study did not compare differences in flavor, vitamins, or functionality, it is questionable whether such differences, if they exist, justify the large price difference between the two groups of foods.

Appledorf, H., Wheeler, W. B. and Koburger, J. A. 1973. Health foods versus traditional foods: a comparison. J. Milk Food Technol. 36:242 (April).

vide tailor-made megaphones for anything sensational.

The media, especially radio and television, are so hungry for controversial or "different" viewpoints (to stimulate audience interest) they seem to seek out those who march to a different drum. The enormous number of talk shows create a talent demand that exceeds the supply. One great gambit is to try to match a Davis, or a Stillman against a Stare, or a Mayer or some other true authority. This can be fatal for the true authority unless he has done his homework. The author, you see, doesn't seem to care what is said so long as the book sells; he has gone beyond peer review. The authority can find himself caught up in a pseudodebate over non-topics giving the impression that the topic is actually debatable.

Why does the media permit Hollywood personalities to spread their foolish notions about health foods? Perhaps it's because after their upteenth time around the talk show circuit, nutrition nonsense is all they have to talk about. They are invited back because somebody must fill the chairs on stage. The mass media does provide the perfect environment for nonsense.

Now we come to the last illustration of why today's environment is perfect for nonsense. Our environment has spawned consumer advocates by the score—some good, some not so good. Speaking out for the consumer has become a way of life for some people. The food industry has more than its share of hecklers among the advocates. Ever so many books have been written about chemicals in our foods by writers who have done little or no research on their subject. They smear by innuendo. Often, their evidence is nothing more than a list of additives from a food label; "Nothing with that many 'synthetic' chemicals can be wholly safe," they say.

The consumer advocate who writes books about chemicals in our foods is one thing. The advocate who truly leads public opinion is quite another. In my opinion, the hue and cry for nutrition labeling, open dating and unit pricing exemplifies a common occurrence. The advocate supposedly speaking for the public is two to five years ahead of the true concern. Two to five years ahead of the public it presumably is representing. It takes this long for the public to become aware of the things with which the advocate is concerned. Perhaps the term "consumer thought leader" would be better than "consumer advocate."

I don't think the public in general has the slightest concept of what is to be involved with nutrition labeling. Unless an education campaign of monumental magnitude can instruct the consumer how to use the label information, the newest regulations on food labeling will fall far short of expectations. The regulations won't help much in the battle against nutrition nonsense.

Many of the nutrition issues under consideration today are false issues, or are issues blown far out of proportion. The spokesman speaks, the public responds, the government acts and sometimes in acting, causes greater problems.

About the Author

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Dr. White is Director, Department of Foods and Nutrition, and Secretary, Council on Foods and Nutrition of the American Medical Association. He received his B.S. degree from Pennsylvania State University, M.S. from Iowa State University, and Sc.D. from Harvard University.

Dr. White has served in a consultant capacity or as an advisory committee member with the U.S.D.A., the Nutrition Program of H.E.W., and the Environmental Protection Agency. He is a member of the Board of Directors of the American Board of Nutrition.

Dr. White edits a monthly column "Let's Talk About Food" in *Today's Health*, has published a book of the same title, and has published 57 papers and lectures.

Worth Reading

Health Foods Facts and Fakes. 1973. By Sidney Margolius. New York: Walker and Company. $6.95.

The author's design is to evaluate many of the controversial concerns that have led to the health food movement, the solutions suggested by an increasing number of advocates of "organic" and "natural" food products, and the pursuit of health through massive doses of vitamin pills.

Five main issues are presented:

1—The anxiety about foods "poisoned" by chemical additives and pesticides.

2—The belief that organic fertilizers produce nutritionally superior foods or, conversely, that chemical fertilizers "poison" foods.

3—The belief that certain foods have such high nutrition that they are virtually miracle foods.

4—The tendency to rely on special foods to cure personal health problems.

5—The belief that vitamin or other food supplements are regularly needed because modern foods are nutritionally deficient, and various vitamins and minerals have special powers.

Mr. Margolius presents claims made by "health foodists," "quacks," popular publications, and product producers. Each claim is evaluated, in light of research to date with bibliography included. When health faddists score valid points, they are given credit.

This book, written for the consumer, points up problems to be solved by the individual consumer, and problems that the author feels can be corrected only by Congress and governmental agencies. Mr. Margolius accepts the personal responsibility for the conclusions, or lack of conclusions, on issues where inadequate documentation prohibits a final verdict.

Health Foods Facts and Fakes is easy, fascinating, enlightening reading for the consumer.

Chicago Nutrition Association—American Medical Association. Nutrition references and book reviews Rev. 1972. $1.50. American Medical Association, Order Department OP 17, 535 North Dearborn Street, Chicago, Illinois 60610.

Nutrition News

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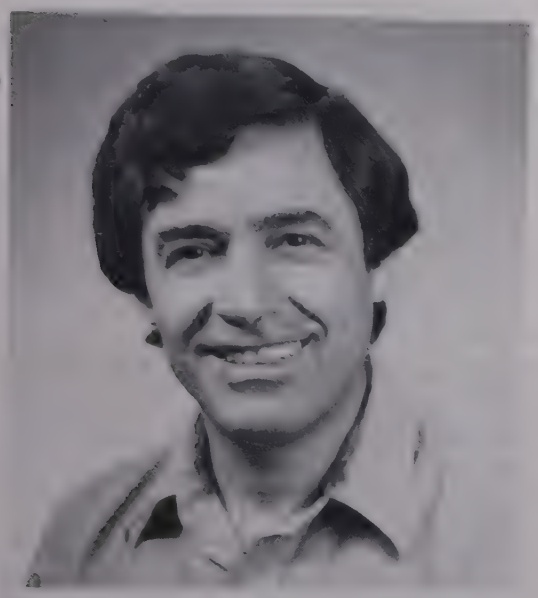
New Forms of Vitamin D_3 and Their Potential Applications



By H. F. DeLuca, Ph.D., Chairman
Department of Biochemistry
University of Wisconsin

In the mid 1960's the idea that vitamin D must be chemically changed within body cells before it can function in the intestines and in bones emerged. In 1968-71, after intense research, new metabolites of vitamin D, some of which are ten to fifteen times more potent than the parent vitamin, were isolated and identified. The first metabolite is known chemically as 25-hydroxyvitamin D_3 (25-OH-D_3). The functional metabolism is shown in Figure 1 at the end of this article.

The 25-OH-D_3 is produced in liver cells. Its biosynthesis from vitamin D_3 is regulated by its own level in the liver. The 25-OH-D_3 is further converted in the kidney to either 1,25-dihydroxyvitamin D_3, (1,25-$(OH)_2D_3$) or 24,25-dihydroxyvitamin D_3 (24,25-$(OH)_2D_3$). The 1,25-$(OH)_2D_3$ has been shown to be a metabolically active form of vitamin D in the stimulation of intestinal calcium transport and bone calcium mobilization. The function of 24,25-$(OH)_2D_3$, if any, has not yet been established.

The biosynthesis of 1,25-$(OH)_2D_3$ is stimulated by parathyroid hormone (PTH) secreted in response to low serum calcium. Production is also stimulated by low serum phosphate concentrations (Pi) occurring as a result of dietary restriction of phosphate. Thus its biosynthesis is regulated in the kidney as well as in the liver, providing two obstacles in the function of vitamin D_3 in the body (Figure 1).

Chemical synthesis of these three metabolites of vitamin D_3 has been achieved. The 25-OH-D_3 will likely become commercially available in the near future. The synthesis of 1α, 25-$(OH)_2D_3$, a form of 1,25-$(OH)_2D_3$, is being improved to yield sizable quantities. In addition, 1 α-hydroxyvitamin D_3 (1 α-OH-D_3), a biologically active analog of 1,25-$(OH)_2D_3$, has been chemically synthesized from cholesterol. In almost every respect, 1 α-OH-D_3 and 1,25-$(OH)_2D_3$ are ten to fifteen times more active than vitamin D_3 in the prevention and cure of rickets in rats and chicks, while 25-OH-D_3 is from two to five times more active than the parent vitamin D_3.

There are two major areas in which the use of new forms of vitamin D_3 may be visualized: (1) as a specific replacement for a missing vitamin D metabolite in a disease state, or (2) to bypass the liver and/or kidney and make a more "active" form of vitamin D available to overcome vitamin D resistance.

In the first case, patients suffering from chronic renal (kidney) disease probably cannot synthesize sufficient amounts of 1,25-$(OH)_2D_3$. Similarly, hypoparathyroid (underactive parathyroid) patients probably cannot synthesize it. Thus both groups of patients should receive therapeutic doses (ca. 1 microgram per day).

Pseudo-vitamin D-deficiency disease (same as vitamin D dependency disease) appears to be a genetic block in the conversion of 25-OH-D_3 to 1,25-$(OH)_2D_3$. This disease is also corrected by administering 1 microgram per day of 1,25-$(OH)_2D_3$.

Undoubtedly other forms of vitamin D-resistant diseases in man will be found to respond to 1,25-$(OH)_2D_3$. In addition, 1 α-OH-D_3 will likely replace 1,25-$(OH)_2D_3$ in these cases since it is more effective orally and is less expensive to synthesize.

In man, disease of the liver has sometimes been associated with rickets or other bone diseases. Thus bone disease associated with an inborn error of tyrosine metabolism (tyrosinemia), congenital absence of bile opening (biliary atresia), ricket-like conditions associated with cirrhosis of the liver (hepatic rickets), and other bone disease associated with cirrhosis should be treatable with either of the more potent metabolites of vitamin D_3.

The 25-OH-D_3 has already been successfully used in the treatment of bone disease associated with dilantin and phenobarbital treatment (anticonvulsant medications) of epilepsy.

Finally, the application of 25-OH-D_3 in some disease states and to agricultural problems where there is no clear theoretical rationale should be mentioned. These applications fall into the second category mentioned above. In man, 25-OH-D_3 has been applied, with more striking results, to virtually every disease which has been treated with high levels of vitamin D. Vitamin D-resistant rickets, renal osteodystrophy (demineralization of bones due to kidney disfunction), vitamin D-dependency diseases, hereditary progressive degeneration of kidney function (Franconi syndrome), and so forth, respond to super-physiologic doses of this metabolite.

The 25-OH-D_3 is a strikingly effective compound in the prevention of milk fever disease in dairy cattle. Oral administration of one milligram of this compound every other day, beginning at least three days before parturition and continuing for two days after, reduces milk fever incidence from as high as 80 percent (in susceptible third lactation or older cows) to less than 10 percent. Similar results have been obtained with an intramuscular dose of four milligrams every seven days. Of special importance is the fact that repeated doses can be given without danger to the animal.

Therapeutic doses of 25-OH-D_3 are also effective in the prevention of leg weakness in poultry. Egg shell strength

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Calcium-binding Protein

Vitamin D_3, when administered to a chick, rat, or dog with rickets, induces the formation of an intestinal calcium-binding protein (CaBP). Considerable evidence indicates a high correlation between the presence of CaBP in the intestinal tissue and the capacity of the intestine to absorb calcium. It appears that CaBP is intimately involved in the vitamin D_3-dependent absorptive process.

This report indicates that the intestinal mucosa of primates (2 species of monkeys) is capable of synthesizing a calcium-binding factor in response to vitamin D_3. Biochemical studies reveal a unique protein in intestinal homogenate samples from vitamin D_3-treated monkeys, which was not present in the untreated animals. The monkey binding factor appears analogous to the vitamin D-induced CaBP identified in other species.

These results make it more likely that a vitamin D-induced CaBP occurs in human intestine.

Wasserman, R. H., Taylor, A. N. 1971. Evidence for a vitamin D_3-induced calcium-binding protein in new world primates. Proc.Soc.Exp.Biol. and Med. 136(1):25 (January).

Vitamin and Mineral Intakes

Mean intakes of calcium, iron, vitamin A, thiamin, riboflavin, niacin, and ascorbic acid of 150 twin pairs, age three to 17 years, derived from at least three weekly weighed dietaries per year for three to eight years were reported. Except for iron, all subjects met or exceeded two-thirds of the 1968 RDA's for these nutrients. Iron intakes were particularly low (50 percent or more below the RDA's) for girls ages 11 to 17 years.

Considerable variation between individuals was noted, especially for vitamin A, ascorbic acid, and calcium intakes. Vitamin A intakes were low in teenage girls. Calcium intakes were low for both sexes 11 to 17 years of age, with that of the girls being considerably lower than that of the boys. A decrease in milk consumption was cited as the cause.

Changes in eating patterns to include foods rich in iron, calcium, and thiamin for both sexes and in vitamin A for girls are recommended.

Peckos, P. S., Ross, M. L. 1973. Longitudinal study of the caloric and nutrient intake of individual twins. II Calcium, iron, and vitamin intakes. J.Am. Dietet.A. 62:404 (April).

Menu Planning—Elementary Style

By Leta G. Seal, R.D., Area Supervisor School Lunch, South Bend Community School Corporation, South Bend, Indiana

School lunch is active nutrition education. Last year a program was developed as a part of the South Bend school curriculum. The general objectives were: stimulate elementary children to choose foods that are interesting and nutritious; show that the study of foods can be fun; integrate foods into other courses of study; explain why variety is important and why the four food groups are beneficial as a lifetime meal guide.

The program developed as two 1½ hour sessions, a week apart, for grades three through six in all elementary schools at the request of the individual teacher.

A shortened session was presented at a monthly meeting of the director of elementary education and elementary principals. They in turn informed their teachers.

Elementary pupils are eager to participate, relate experiences, and show what they have learned as they are asked:

1. Why do we eat?
2. What are the five senses and how do they relate to eating?
3. What does "breakfast" mean?
4. What happens to you if you do not eat breakfast?

Using the family car as an example —upkeep (points, plugs, tune-up) and refueling (gas, oil, water)—we talk about the necessity of eating regular nutritious meals. On the blackboard are written the three major meals and the time eaten. (Add a bedtime snack if most of the class have one regularly.) The class figures the hours between refueling. Elapsed time is compared between the last meal of the previous day and breakfast, or lunch if breakfast is omitted. This is the first time some of them have been aware of the importance of a good breakfast. At the same time, it is pointed out that traditional breakfast food need not always be eaten for this healthy beginning. The class is encouraged to suggest other foods.

The four food groups and the Type A School Lunch pattern are discussed. Food models are used in planning lunch menus. A movie on foods to eat is viewed and used to sum up the discussion.

At the second meeting the four food group and Type A patterns are reviewed. Ground rules for menu planning are made. Starting with the main dish, and the others in turn, suggestions from the students are written on the blackboard. Each student has one vote for an item from each food group; the majority wins. There is considerable interchange about specific foods, textures, colors, preparation procedures, and likes and dislikes of class members. After each menu is completed it is checked for four food group and Type A pattern fulfillment.

When one class in a school plans the lunch, the whole school joins them to eat "their" menu. It's rewarding to hear, "Mrs. Seal, I tried broccoli today and I like it!"

There is no one method of evaluation, but the enthusiastic feedback indicates the program has been and will continue to be successful. New requests and requests to repeat from teachers who have participated are received. This nutrition education program is planned to be an ongoing project with more class time provided in the future.

Menus are published in local papers on Wednesday for the following week. A bar graph of the student planned menu shows the nutrient values provided and gives parents an adequate picture of "school lunch" and what it contributes to the daily nutrient intake of children. Nutrients included in the graph are protein; vitamins A, C, D, niacin, thiamin, riboflavin; calcium, iron; and calories.

Parents are invited to join the children for lunch and to visit the kitchens at any time. Parents can help by encouraging their children to eat "the whole thing."

The Woodlawn Health Center Weight Reducing Program

By Laura Mae Rabb, Public Health Nutritionist,
Chicago Board of Health, Chicago, Illinois

The premise that group teaching is effective in helping people overcome problems with weight control was the foundation of the Woodlawn Health Center Weight Reducing Program. The program's specific objectives are to provide essential information and materials, to introduce moderate fun exercise techniques, to motivate participants to lose weight and maintain normal weight over a long-term period.

Participants were allowed to set their own weight goals after being informed of the average weight for their age and body build. At first some felt that a future of skin and bones didn't seem too attractive and would be a step toward the grave.

Members are weighed at the beginning of each weekly group session. In spite of all the long speeches encouraging weight loss, the *weigh-in*, with the "ooh!" and "ahs!" seems to be the most impressive motivating force.

A week's dietary intake is requested at the start and at intervals as the group sessions proceed. The intake record is necessary to understand the eating habits of the individual and to ascertain changes in the diet coinciding with weight reduction.

Each participant pays 25c a week, plus 25c for each pound gained. At the end of the month, the member losing the most weight receives the money collected. This idea proves to be fine for the winner, but an excruciating experience for the losers. When jealousy instead of competitiveness starts to filter into the group the practice is dropped.

Weekly physical activities are planned. The activities range from walking, running, bowling, and exercising, to playing softball. The idea that they are too old for such things is soon dispelled by the fun they have while expending energy. Dancing is another form of physical activity enjoyed by most people. Members are encouraged to go dancing with their peers and to do modern dances which increases the energy expenditure.

Dietary habits are not easily changed. Thus members are allowed to plan their own low-calorie meals under supervision. Explanations of food groups and the nutrients each contributes are given. The Diabetic Exchange System is used as a calorie guide; but food groups, food preparation methods, and size of servings are also major concerns.

Reducing caloric content of meals calls for adjustment in recipes and cooking techniques. To emphasize this point, members participate in a "Low Calorie Luncheon Buffet." They contribute and prepare the food in the home of one member. Another time, a picnic culminates a 28-block walk.

The leveling off of questions indicates understanding of the information presented. Older members are encouraged to help new members with their problems.

Woodlawn Health Center is a comprehensive, ambulatory family health care facility providing care on a continuing basis. The immediate goals are to improve the general health of Woodlawn residents.

Members of the reducing program are referred by health center physicians and nurses. Weight gain is a constant complaint of oral contraceptive users, therefore many of the participants are referred by the Family Planning Clinic in which they are registered. All participants receive a physical examination.

Materials used in the program are drawn from selected sources and chosen for simplicity, clarity, and adequacy of information presented.

The members, through instruction, discussion, hand-out materials, and guided activities gain knowledge of methods of losing weight efficiently through diet and exercise.

Measuring Vitamin D Deficiency

A study of Asian immigrants to Britain indicates circulating 25-hydroxycholecalciferol (25-OH-D_3) levels should be useful in the assessment of patients with osteomalacia or rickets. 25-OH-D_3 made from D_3 in the liver, is the major circulating form of vitamin D_3. The assay involves competitive protein-binding and is very sensitive for 25-OH-D_3. In the past, serum-alkaline-phosphatase level (higher levels associated with vitamin D deficiency) has been a commonly used index of hidden osteomalacia or rickets.

This study demonstrated a reduction in 25-OH-D_3 concentration in a symptom-free group. In a group with overt rickets or osteomalacia, 25-OH-D_3 was undetectable. The 25-OH-D_3 levels could be raised to the normal range with small doses of vitamin D_3, which cured the rickets. The deficiency appeared to be due to inadequate intake rather than an inability to metabolize the vitamin.

Preece, M. A., McIntosh, W. B., Tomlinson, S., Ford, J. A., Dunnigan, M. G., O'Riordan, J. L. H. 1973. Vitamin D deficiency among Asian immigrants to Britain. The Lancet 1:907 (April 28).

Vitamin D, Sunlight, and the Elderly

One-hundred and three elderly patients' (average age 78) vitamin D intake, sunlight exposure, and biochemical indications of osteomalacia were studied. Osteomalacia (a softening or bending of bones) associated with a dietary vitamin D deficiency is usually termed "nutritional." However, the relative importance of sunlight in vitamin D synthesis makes it difficult to estimate vitamin D requirements for adults.

In this study, vitamin D intakes were low (averaging 64 I.U. per day) but showed no correlation with biochemical indications of osteomalacia. In contrast, sunlight exposure time was significantly correlated.

"Nutritional" osteomalacia in some elderly persons is perhaps better thought of as "osteomalacia of the housebound" because of sunlight lack.

Hodkinson, H. M., Round, P., Stanton, B. R., Morgan, C. 1973. Sunlight, vitamin D, and osteomalacia in the elderly. The Lancet 1:910 (April 28).

Worth Reading

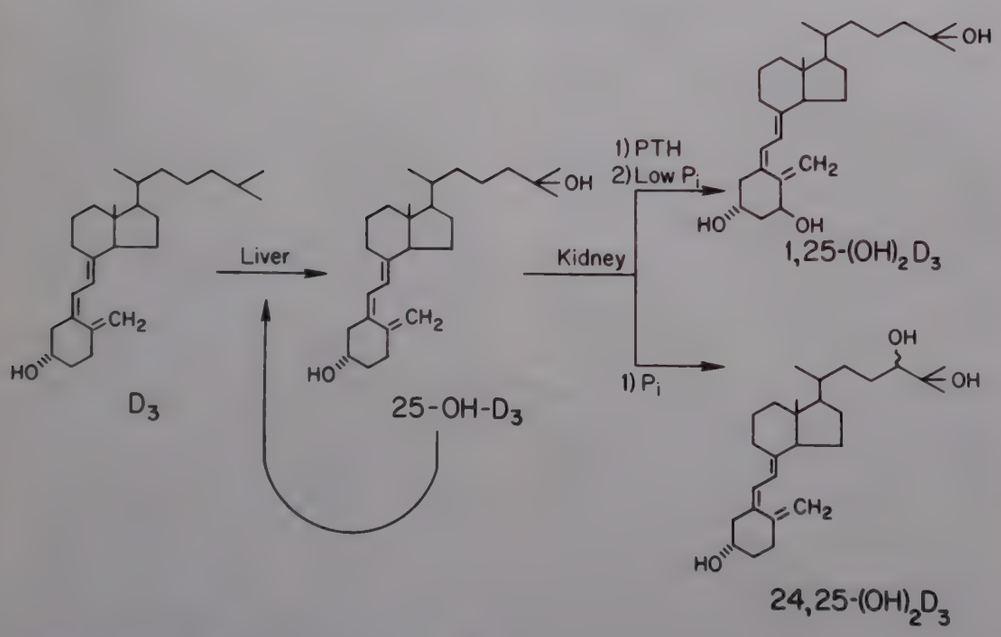
and quality are increased with therapeutic doses.

Potential application to agricultural problems has not been thoroughly explored, but indications are that these new metabolites of vitamin D may provide feasible new solutions to problems of bone disease in man, and to practical calcium problems in agriculture.

CORRECTION: October, 1973 Vol. 26, No. 3. In The Perfect Environment for Nonsense, page 9, column 2, last sentence in third paragraph: "There is essentially no evidence that it is of any value in amounts *about* 25-50 mg . . .," should read " . . . *above* 25-50 mg . . ."

Figure 1

Functional Metabolism of Vitamin D_3



About the Author

Hector Floyd DeLuca, Ph.D.

Dr. DeLuca is chairman of the Department of Biochemistry at the University of Wisconsin.

He has merited many awards through his biochemical research and more than 190 publications on vitamins A and D, parathyroid hormone, and calcitonin. His awards include: Mead Johnson Award of the American Institution of Nutrition, 1968; Andre Lichtwitz Prize from the French Institute National de la Sante et de la Recherche Medicale, 1969; Nicolas Andry Award from the Association of Bone and Joint Surgeons, 1971; Osborne and Mendel Award of the American Institute of Nutrition, 1973; Eli Lilly Lecturer of the Endocrine Society, 1973.

Dr. DeLuca, a native of Colorado, received his B.A. degree in chemistry, with honors, at the University of Colorado. He received his M.S. and Ph.D. in biochemistry from the University of Wisconsin.

Eating Disorders. 1973.
By Hilde Bruch, M.D.
New York: Basic Books. $12.50

Dr. Bruch offers "The hypothesis that obesity and anorexia nervosa are related to faulty hunger awareness, and that 'hunger' is not innate knowledge; learning is necessary for its organization into recognizable patterns." Obesity and anorexia nervosa are neither purely physiochemical nor physiological nor due to psychological or social factors alone. They develop as an expression of disturbances in the interaction of these forces.

Eating Disorders is based on studies of patients referred by physicians to Dr. Bruch over the past 35 years. She presents detailed case studies of individuals who misuse the eating function in their efforts to solve or camouflage problems of living. Food lends itself readily to such usage because eating is closely intermingled with interpersonal and emotional experiences; and physiological and psychological aspects cannot be strictly differentiated.

Long range follow-up histories are presented of patients who eat excessively or who restrict their intake to the point of becoming dangerously emaciated.

Dr. Bruch says that the real problem in treatment is lasting improvement, and that unsatisfactory therapeutic results are related to inadequate conceptualizations of the underlying problems.

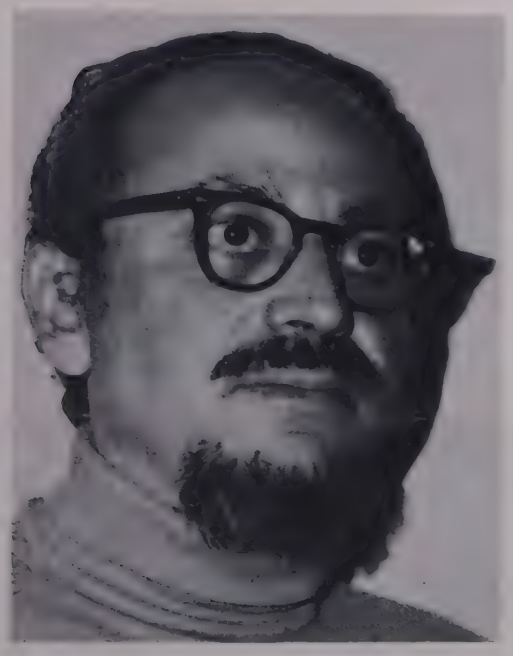
Dr. Bruch's personal conviction is that hostile attacks on weight as evil have helped cause obesity to become such a serious national health problem. Her book ends with "Prevention of obesity calls for social acceptance of human diversity and fostering freedom and initiative in the individual."

Eating Disorders, although a scientific volume, is an unusually readable study of eating behavior.

Nutrition News

FEBRUARY 1974 VOL. 37, NO

Dietary Calcium and the Reversal of Bone Demineralization



By Leo Lutwak, M.D., Ph.D.
Professor of Medicine, UCLA
Chief, Section of Endocrinology, Nutrition and Metabolism, VA Hospital, Sepulveda

The functions of dietary calcium and phosphorus have been considered repeatedly. We are now ready for a new look. Newer kinetic, endocrine, and nutrition knowledge may lead to a reevaluation of the role of dietary calcium in periodontitis and osteoporosis.

Almost 99 percent of the body's calcium is in the skeleton. The other 1 percent is found in extracellular fluid and participates in a number of life-support systems, i.e. blood clotting, hormone action, transport across cell membranes, and neuromuscular irritability. How does calcium move into and out of the body envelope?

Calcium can enter the body only through the diet. Several mechanisms exist, however, causing calcium to be continuously lost from the body. Renal excretion is relatively fixed for most individuals at between 100 and 200 milligrams daily under normal circumstances, relatively independent of dietary intake. Loss of calcium in the bile and pancreatic juices, which are secreted into the gut and not reabsorbed, amounts to about 140 to 175 milligrams per day. Dermal losses of calcium average about 20 milligrams per day.

In the female, calcium may be lost in the development of the fetus during the last trimester of pregnancy and during lactation.

If the loss of calcium is less than the amount which is being absorbed from the diet, excess calcium will be present which can be deposited in the skeleton. If, however, the loss exceeds the intake, calcium then must be mobilized from the skeleton in order to maintain the homeostatic concentration in extracellular fluid necessary for life.

The mobilization of calcium is under the influence of various endocrine glands: pituitary, thyroid, adrenal, and parathyroid. Through the net effect of all of the hormone systems, calcium is deposited in or removed from the skeleton to help maintain the proper homeostatic concentration.

Are dietary calcium deficiencies sufficient to explain the development of periodontitis and osteoporosis?

Let's consider a hypothetical woman 50 years old and weighing about 135 pounds. Weighing almost the same at the age of 20, her skeleton would have contained about 1,500 grams of calcium. Now over the course of the past 30 years, having eaten a diet about average for middle-class American populations, daily dietary calcium would have dropped to 400 milligrams per day.

The National Research Council's Recommended Dietary Allowance for calcium is 800 milligrams. Many dietary surveys indicate that a vast majority of American adults, and particularly women homemakers, consume only about 400 milligrams daily. The range of absorption of a 400 milligram intake of calcium is between 10 and 50 percent.

If the losses are added (270) and the absorption (180) is subtracted, the difference is a 90 milligram negative balance per day. Over the course of 30 years, 90 **milligrams** per day totals 980 **grams** of calcium. With 1500 grams of calcium in the skeleton at age 20 and a negative balance of 980 grams of calcium by age 50, about one-third of the skeletal calcium remains.

Calcium absorption is greatly affected by the ratio of dietary calcium to phosphorus. In 1960 this ratio in the American diet was 1:2.8. U.S.D.A. figures at that time demonstrated that milk was the primary source of calcium. However, several major dietary sources of phosphorus exist. Milk provides some. Poultry, fish, and meat provide larger amounts. Significant changes in American diets have occurred since 1960. Milk consumption has decreased while meat consumption has increased. People who no longer drink milk substitute other liquids, which, in the last few years, have tended to be non-nutritious soft drinks some of which contain excess phosphorus in the form of phosphoric acid. Such dietary changes have caused an increase in phosphorus intake and a decrease in calcium intake so that the calcium/phosphorus ratio today approaches 1:4, a striking imbalance.

This imbalance in calcium/phosphorus ratio, decreased efficiency of the body to absorb calcium as age increases, coupled with an inadequate dietary calcium supply may lead to serious problems of skeletal health.

Coincidental appearance of severe periodontal disease with disruption of trabecular bone structure in the jaw as well as vertebral fractures and osteoporosis elsewhere in the body have been found. Review of hospital records indicates virtually a 1:1 ratio of patients having periodontal disease in association with osteoporosis. This has lead to the conclusion that some forms of periodontal disease with resorption of bone may very well be the long sought for preosteoporotic condition wherein the patient is still capable of regenerating bone.

A group of 90 patients with mild degrees of periodontal disease were selected as patients with possible preosteoporosis. Bone density was measured at the start of the study and at monthly intervals thereafter by photon densitometry. Patients were divided into groups that received either a one gram calcium supplement daily or a corresponding placebo for 12 months. There were only minor statistically significant differ-

Continued on Page 4

SUCCESS OF PREVENTIVE DENTISTRY?

In a survey of 347 prevention-oriented dentists, 98.3 percent indicated that they practiced preventive dentistry, but only 36.6 percent were found to have satisfactory programs. Values were assigned to aspects of diagnosis, treatment, and education of patients to evaluate the quality of the programs. Diagnosis is recognized as a key to preventive dentistry. However, among diagnostic aids, only 18.5 percent of the dentists performed nutritional analyses in spite of the attention nutrition is receiving in other areas and the potential merits which could be derived. Continuing education for both the dentist and patient is required in any successful preventive dental program.

The study concluded that if the prevention-oriented dentist is failing, then the rest of the profession must be even farther from the goal of prevention, and the public will suffer the consequences.

Akst, H., DeMarco, T. J., Duchon, S., Meclovsky, E. and Resnick, J. 1973. A profile of clinical preventive practice. J. Am. Dental Assn. 87:857 (October).

CARIES AND BETWEEN-MEAL SNACKS

No significant relationship was found between caries experience and between-meal eating patterns in 1486 high school students. The population surveyed included white and black students in Detroit, Michigan and Columbia, South Carolina. The survey involved a dental examination and a self-administered questionnaire on amount and frequency of sucrose-containing between-meal snacks and cariogenic foodstuffs.

The results of this study were not as expected. Caries experience was not associated with between meal eating patterns, racial, or geographic groups. The caries experience that was recorded was thought to be the result of a lifetime exposure to the particular oral environment. In addition, past caries experience does not necessarily indicate a strong relationship to snacking habits, which could change.

Bagramian, R. A. and Russell, A. L. 1973. Epidemiologic study of dental caries experience and between-meal eating patterns. J. Dental Res. 52:342 (Mar.—Apr.).

Big Response to Connecticut TV Panel

By Nancye B. Perry, R.D., Director of Child Nutrition Programs
Connecticut State Department of Education

If you don't know, ask! This was the theme of a recent 10-week series of half-hour "phone-in" sessions on a nutrition broadcast shown on Connecticut Public Television.

The "phone-in" session was part of a television course called "Food for Youth" sponsored by the New England State Educational Council to safeguard and improve the nutritional status of children.

"Food for Youth," comprised of 10 half-hour television programs, focused on nutrition. It began with the science of nutrition, progressed to the art of nutrition, discussed nutrition for the soul, and concluded with a practical approach to using this knowledge. Nutritional guidance, a study guide, and weekly quizzes were provided.

One program directed the attention of the viewer to the serious health problems in our nation. Virtually everyone is affected by one of the problems cited—dental caries, or tooth decay. Even though some questions remain unanswered relating to tooth decay, research indicates that some nutrients do play a role in our dental problems.

Bacteria feed on carbohydrate-rich foods just as our bodies do. They produce an acid waste product which may penetrate tooth enamel causing dental caries, or tooth decay. High-sugar foods, especially sticky types such as caramels, seem to be the worst offenders. This does not mean that we must eliminate carbohydrates from our diet. It does infer, however, that some of the "sweets" should be restricted and care exercised to cleanse the mouth after eating.

Other nutrients also took the spotlight in the series' examination of the incidence of dental caries. Foods high in calcium, phosphorus, and vitamin D affect tooth structure during the formative period.

Fluoride in food and water appears to be the chief nutrient capable of fighting tooth decay. Even though found naturally in certain foods such as fish, dry beans, and tea, the quantity is insufficient to protect the teeth. Thus, we find many communities adding fluoride to their water supplies where it does not appear naturally. The American Medical Association statement reads, "On the basis of available evidence, it appears that fluoridation decreases the incidence of caries during childhood. Other evidence indicates a reduction of dental caries up to at least 44 years of age."

From the dental program, one concludes that a successful program for the prevention of dental caries involves a threefold approach: 1) avoid excessive amounts of foods which provide the medium for bacterial action in the mouth, 2) maintain good nutrition throughout life, and 3) increase the resistance of tooth decay through fluoridation.

Connecticut's "phone-in" sessions were an added half-hour to the "Food for Youth" course. A panel of experts, on live camera, answered questions on nutrition called in by viewing audience. During the 10-week series 120 questions were answered.

The viewing audience consisted mainly of school-age children, homemakers, school food service personnel, physicians, and other adults, each with different interests, but each searching for accurate information on the food persons eat or should eat daily.

Questions varied from "Why can't I buy Coke instead of milk with my school lunch?" to "Does grapefruit have enzymes that help dissolve body fat?"

The course stimulated an overwhelming response with 1,570 Connecticut school food service personnel and interested adults registering in the course.

While the "phone-in" series required substantial work, the results in terms of interest generated by the viewing audience was well worth the effort.

An In-School Oral Hygiene Program

By Susan Rosenheck, M. Ed.
Program Coordinator

In an effort to prevent tooth decay, school faculty members can incorporate practical oral hygiene and nutrition in elementary classes. Instruction in toothbrushing techniques, the use of dental floss, and nutrition information has become part of the fourth grade curriculum in one school in Richmond County, Georgia. It is called the In-School Oral Hygiene Program (ISOHP).

In a 16-week pilot program, effectiveness of the ISOHP was measured by plaque control. Classes were heterogeniously grouped to consist of children of middle and low socioeconomic status. Four of the five classes were racially integrated. The fifth class, part of the control group, consisted of black students only.

Students in two classes practiced toothbrushing and flossing techniques at school each day. Others were told to do so at home.

A pedodontist examined two surfaces of each of six selected teeth. Plaque was stained bright red to be visible to the student using a mirror and to the pedodontist.

Each student was issued a scorecard for recording evidence of plaque using a scale of 0 through 4. Zero indicated the absence of plaque while four indicated a tooth nearly covered with plaque.

Following the pre-examination each child was issued a toothbrush and a spool of dental floss. They were instructed in the use of each.

The science teacher taught a unit on dental health to all classes. Students were taught that diet has a direct effect upon plaque formation. Bacteria are always present in the mouth and act upon certain foods to form acids that eat away the teeth (decay) and the gums (periodontal disease). They become more conscious of foods containing refined carbohydrates. Because such foods intensify plaque production, students planned menus and snacks containing foods low in carbohydrates. In addition, the subjects learned the importance of avoiding foods that would crack the enamel on their teeth, and thereby increase the possibility of cavity formation.

Once each week students in the experimental group used disclosing tablets. They looked over their pre-examination scorecards. The areas where plaque was most evident in each mouth were discussed so that the student became more conscious of the areas that were most often neglected.

Thirteen and one-half weeks after the pre-examination, the pedodontist re-examined the subjects' teeth. The resulting plaque scores were compared with those of the pre-examination. Students appeared quite interested in their progress scores. Only two subjects of 41 in the experimental group had total scores which indicated regression in plaque control. Three subjects of 53 in the control group fell into this catagory. All other students had progressed.

Students in the experimental group took home their toothbrushes and dental floss. All students were encouraged to exercise the oral hygiene procedures at home. None of the students were informed that they would be post-examined again.

Two and one-half weeks after the first post-examination, the pedodontist returned for post-examination II to determine the effect of the absence of daily oral health instruction. Scores of post-examination I were the lowest (indicating the least amount of plaque) for the majority of students. Post-examination II showed that the progress of many of the subjects in the experimental group had been reduced.

The median change in scores between the pre-examination and post-examination I for all subjects was −10. The greatest reduction in scores was −26.

FLUORIDE PASTE-CARIES INCIDENCE

The efficacy of an acidulated phosphate fluoride (APF) paste was assessed when applied semiannually by a dental hygienist. Previous work indicated that dental caries could be reduced by topical application of fluoride, however, an evaluation had not been made in a program of professional application.

The two-year study was completed by 320 children (treatment and control), ages 10 to 13 years. APF paste was applied four times. Temporary teeth were collected for analysis, while biopsy specimens of permanent teeth were taken at the end of the study. A significantly greater fluoride concentration in the enamel was noted in the APF paste-treated group. The data indicate a greater effect of APF treatment in teeth erupting during the study (36 percent caries reduction), than in teeth present initially (21 percent reduction).

DePaola, P. F. and Mellberg, J. R. 1973. Caries experience and fluoride uptake in children receiving semiannual prophylaxis with an acidulated phosphate fluoride paste. J. Am. Dental Assn. 87:155 (July).

BREAKFAST CEREALS AND CARIES

Three types of ready-to-eat cereals with different nutritional values were fed to rats for 28 days as 64 or 100 percent of the diet. More caries resulted from eating cereal containing the least sugar (8 percent) than presweetened cereal (43 percent sugar). The least caries occurred with a mineral-enriched cereal (19 percent sugar).

Factors other than sugar content are important in determining caries attack. This study suggests that mineral content may modify caries occurance.

A possible protective effect of casein (milk protein) absorbed on the enamel surface was proposed for the 64 percent cereal diets (30 percent casein).

Rats on two of the 100 percent cereal diets (8 and 43 percent sugar) exhibited the least weight gain. The study cautions that overall nutritional status could affect the incidence of dental caries.

Choung, U. B., Bibby, B. G. and Losee, F. L. 1973. Some effects of breakfast cereals on caries in rats. J. Dental Res. 52:504 (June).

ences measured in bone density of radius or ulna (arm bones) noted during this period of time.

Significant changes were seen in the jaw. The group receiving the placebo showed no significant change over the 12 months. The group receiving calcium supplements showed approximately 12½ percent statistically significant increase in bone density as a result of supplementation with dietary calcium.

What is the possible role of dietary calcium in bone metabolism? The usual individual eats three or four meals per day. Within half an hour to about two hours after the meal is eaten serum calcium rises, if calcium has been present in the food. This rise is slight, but detectable. Subsequently, serum calcium falls because of accretion processes and excretion. The resulting push-pull action continues through the day, with serum calcium rising and falling, and bone being formed and resorbed. If, however, the amount of dietary calcium is inadequate, if losses from the body exceed the amount that is being absorbed, there is no time during the day when bone resorption of calcium can take place. Thus, we may suggest a logical mechanism for the prevention and therapy of osteoporosis, is utilizing adequate amounts of dietary calcium to avoid bone resorption.

Periodontal disease, as defined by dentists, is any disease which affects any of the tissues surrounding the tooth, the periodontal tissues, the gingiva, the gum, the alveolar bone, the periodontal membrane, or the cementum that holds the tooth to the socket.

We have hypothesized that the primary disease causes a decrease in density of the alveolar bone in a significant number of patients with periodontal disease. Following a gradual continuous loss of calcium from this supporting bone, the teeth begin to move about in their sockets. Gradually, chewing begins to cause irritation and damage to the gingiva. The damaged tissue bleeds, shows inflammatory changes, and becomes readily infected with plaque. If our hypothesis is correct, some types of periodontal disease could be reversed by repleting dietary calcium. It should be mentioned, however, that certain types of periodontal disease affect only the gingiva and have no effect on the bone.

Based on our research findings there is a hierarchy of change when bones start to demineralize under osteoporotic conditions. First, decreases in bone density are detected in the jawbone, then in the vertebrae and other bones in the body. If periodontal disease is correctly diagnosed and correctly treated by increasing the dietary calcium at the time it's first found, then the vertebral disease (osteoporosis) doesn't progress to the point where fracture can occur.

People visit dentists on a regular basis but only go to physicians after trouble is well-established. An excellent example of preventive medicine in action can be illustrated by the dentist who detects early jawbone demineralization. If his diagnosis is substantiated, he can initiate proper therapeutic regimens to improve calcium intake before the disease has progressed to osteoporosis of the vertebrae.

This hypothesis is based on quite preliminary information from which we hope eventually to build a greater body of facts.

About the Author

Leo Lutwak, M.D., Ph.D.

Dr. Lutwak is Professor of Medicine at the University of California, Los Angeles, and Chief, Section of Endocrinology, Nutrition, and Metabolism in the Veterans Administration Hospital, Sepulveda, California.

Dr. Lutwak has conducted extensive research in calcium, phosphorus, and magnesium metabolism; energy physiology; isotope kinetics; and clinical and space nutrition at Brookhaven National Laboratories, Yale University, Cornell University, and University of California. He is the author of many scientific articles and chapters in numerous scientific books.

Dr. Lutwak has served as consultant to NASA and the National Institutes of Health.

Worth Reading

Two 1973 college texts on nutrition are written with the viewpoint that there is a need for studying nutrition in an interdisciplinary context.

Frederick J. Stare and Margaret McWilliams have so written **Living Nutrition.** The introduction of nutrients provides the foundation for a global look at the numerous aspects of the social sciences that shape the dietary patterns of people throughout the world. Stare and McWilliams "feel that the technical portions of their book achieve a greater depth of understanding when they are based on the sociological and applied aspects of nutrition."

The treatment of nutrition is divided into two sections: 1) physiological viewpoint and 2) sociopsychological aspects chapters covering nutrition throughout the life cycle, health foods, and worldwide nutrition as well as feeding the future world population.

The manuscript was tested in nutrition classes at Framingham State College in Massachusetts and California State University in Los Angeles.

Fundamentals of Normal Nutrition, second edition, by Corinne H. Robinson, has a threefold aim: 1) provide a basic foundation in the science of nutrition; 2) show nutrition applied to dietary selection with simultaneous consideration of economic, psychologic, social, and cultural factors; and 3) develop awareness of the role citizens can assume in nutrition issues.

Nutrition education is an important theme. Programs for better nutrition through education with application in elementary and secondary schools, and adult education through community action are presented.

Both textbooks include excellent nutrition data and bibliographies.

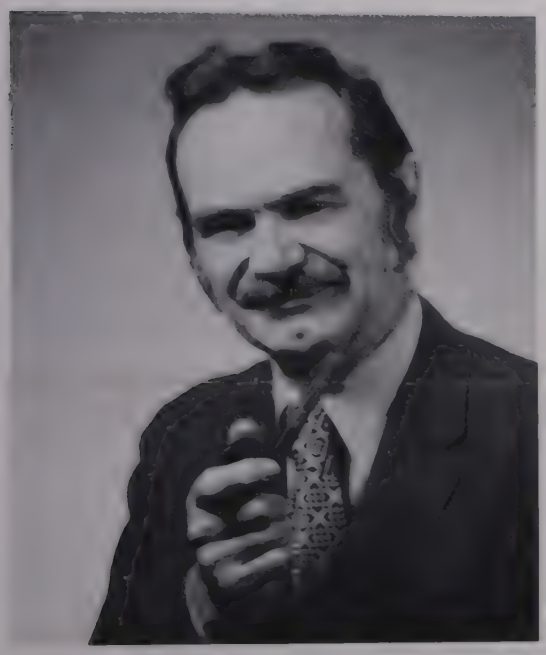
The 1968 Recommended Dietary Allowances and four food groups are used in both books. Robinson also presents dietary allowances from the Food and Agriculture Organization, Canada, and the United Kingdom.

Stare, F. J. and McWilliams, M. 1973. Living nutrition. New York: John Wiley & Sons, Inc.
Robinson, C. H. 1973. Fundamentals of normal nutrition. 2nd. ed. New York: The Macmillan Co.

Nutrition News

APRIL 1974 VOL. 37, NO. 2

The New Recommended Dietary Allowances



Alfred E. Harper, Ph.D., Chairman
Department of Nutritional Sciences
University of Wisconsin, Madison
Chariman, FNB/NAS Committee on
Recommended Dietary Allowances

The Recommended Dietary Allowances (RDA) of the Food and Nutrition Board, National Academy of Sciences, National Research Council (FNB/NAS/NRC) are revised every four to six years. After each revision, articles are published to explain differences between the current and previous allowances.

The FNB has been concerned about how well the meaning and purposes of RDA are understood. The recently published eighth edition of the RDA includes two introductory sections which discuss procedures used in developing allowances and precautions to be observed in using the allowances.

RDA are defined as "levels of intake of essential nutrients considered . . . on the basis of available scientific knowledge to be adequate to meet the known nutritional needs of almost every healthy person." This definition has several implications. One, RDA are recommendations for amounts of nutrients that should be consumed and, hence, do not allow for amounts lost during processing or preparation of foods. Two, they are recommendations for maintenance of health. They do not cover special needs due to illness. Three, they are estimates of known physiological nutritional needs to ensure a satisfactory rate of growth of children and maintenance of weight and prevention of nutrient depletion of adults. They are not meant to be optimal or ideal intakes, nor recommendations for an ideal diet. There are no satisfactory criteria for an "ideal" diet. Four, the RDA cannot be average requirements if they are designed to meet the physiological needs of almost every healthy person. To meet the needs of those with the highest requirements, they will exceed the requirements of most people.

The RDA are public health recommendations designed as guides for safeguarding the health of the entire population. As such, they are not appropriate standards for assessing individual nutritional needs. A person who consumes less than the RDA is not necessarily consuming an inadequate diet. Yet, as the proportion of people in a population who are consuming less than the RDA increases, the probability that some of them consume inadequate diets increases. Deficiencies can be identified, however, only through clinical and biochemical examination. On the other hand, a person who consumes amounts of nutrients equal to or greater than the RDA is, in all likelihood, consuming an adequate diet.

Misunderstanding and misinterpretation of the RDA stems in part from the widespread desire for guidance about "ideal" diets, and from the assumption that the term "RDA" carries this connotation. Failure to recognize the public health nature of the recommendations and the assumption that "RDA" implies average requirements, both result in misunderstanding. Also, discrepancies among the allowances themselves, and differences between the RDA and nutritional recommendations of other countries, contribute to confusion about the concept.

If the RDA are too high, when results of food consumption surveys are evaluated, intakes of nutrients exceeding physiologic needs will be assessed as inadequate without clinical evidence of inadequacy. If allowances are too low the reverse will be true. The likelihood of the latter is less as committees on RDA tend, when in doubt, to select the higher of alternative values. There is, therefore, a continuing need to strive for consistent and realistic allowances.

After wrestling with some of these problems for the past four years, the RDA Committee recommended, and the FNB approved, lower allowances for vitamin C (ascorbic acid), vitamin E, vitamin B_{12}, and protein.

The ascorbic acid allowance for adults was reduced from 60 to 45 milligrams (mg) per day on the basis of information from human ascorbic acid turnover studies in Iowa. Hodges, Baker, and their associates concluded that many of their healthy subjects metabolized about 30 mg of ascorbic acid per day and that 45 mg per day would maintain an adequate body pool of vitamin C. This reduction still leaves the NAS/NRC allowance well above those of Canada, Britain, and Food and Agriculture Organization and World Health Organization (FAO/WHO) of the United Nations.

The vitamin E allowance was reduced from 30 to 15 mg per day for adults and proportionately for other age groups on the basis of new information about the vitamin E content of diets and evidence that vitamin E insufficiency is observed only in premature infants and in persons with impaired fat absorption. It is recognized that vitamin E requirements increase with increasing consumption of polyunsaturated fatty acids. This is not considered a problem as most sources of polyunsaturated fatty acids are also good sources of vitamin E. It is now recognized that about 20 percent of the vitamin E activity of U.S. diets is from forms of tocopherol other than alpha-tocopherol.

The vitamin B_{12} allowance was reduced from 5 to 3 mg per day for adults, and similarly for other age groups. This recommendation was based on information about vitamin B_{12} absorption, requirements of pernicious anemia patients, and results of recent studies of vitamin B_{12} turn-

Continued on page 6

over in human subjects.

The protein allowance for adults was reduced from 0.9 to 0.8 gram (gm) per kilogram (2.2 pounds) of body weight per day. The reduced allowance is 56 gm per day for men and 46 gm for women. These allowances are based on results of nitrogen balance studies on adults consuming high-quality proteins, and on the assumption that the mixed proteins of U.S. diets are used about 75 percent as efficiently as high-quality proteins. The additional allowance for the pregnant woman was increased from 10 to 30 gm of protein per day throughout pregnancy. The Board accepted the higher values from nitrogen balance studies on pregnant girls rather than the lower values from indirect measurements of nitrogen storage during gestation.

Zinc was added to the list of nutrients in the table of allowances with 15 mg per day being recommended for adults and proportionately less for other age groups. The impetus for this was evidence that low zinc intakes may be a problem in the U.S. Impaired taste and smell acuity in children have been found in association with low zinc content of hair.

Calcium allowances were discussed extensively by the RDA Committee. The arguments for reduction of the allowances were that many people in the U.S. have calcium intakes below the RDA, and many people in other countries have calcium intakes well below those in the U.S., all without evidence of calcium insufficiency. However, recent studies of calcium balance in man have demonstrated that urinary calcium loss increases with increasing protein intake. As protein intake in the U.S. is high, the Committee recommended that the allowance for calcium of 800 mg per day for adults be retained. It was acknowledged in the text that less calcium is required by persons with protein intakes as low as the protein allowance.

Other allowances were not altered but the niacin allowance is reported as niacin rather than as niacin equivalents in the eighth edition. The committee recognized the importance of tryptophan as a precursor of niacin and that 60 mg of tryptophan is considered to provide one mg of niacin. However, values for efficiency of conversion of tryptophan to niacin are quite variable. As tryptophan has

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Nutrition on Wheels

Barbara Ann Ware, Homaking Teacher
Metropolitan Learning Center, Dallas, Tex:

Since 1971, a mobile classroom has taken nutrition education to consumers in the Dallas Independent School District.

The school district initiated the Homemaking and Consumer Education Classroom on Wheels after finding that many adults can't or won't leave their own neighborhoods to take advantage of nutrition and consumer information opportunities.

The "classroom on wheels" supplements the 33-year-old ongoing adult education program offered in coordination with the Public Housing Authority.

This mobile laboratory, under the direction of Miss Jerline Kennedy, Assistant Director, Occupational Programs, provides classes and individual instruction Monday through Friday during the school year. Each semester the classroom is moved to a different elementary school in the inner city.

Teachers, Billie Rutledge and Mary Kingrea, hold open house for the elementary students to tour the "big, white trailer" on their school grounds. Every student is given an invitation to take to their parents inviting them to an open house. In addition, posters announcing the arrival of the trailer are placed around the community.

Individual and small group instruction is the tenet of the mobile classroom teaching. Each class is based on the needs, interests, and requests of the members. Often the needs of those with limited incomes are best met by instruction on a one-to-one basis.

Classes include meal planning for health, comparative buying, and using food stamps. The main emphasis is not on preparing a recipe, but on planning nutritionally adequate meals based on family needs and resources.

Teachers help parents to understand that some of the foods their children eat contain "empty" calories. Adults list the snacks they give their children. The snacks are then graphically compared to more nutritious foods such as peanut butter sandwich, fruit, or milk using nutrient *Comparison Cards.*

In addition to working with the adults in these areas of nutrition, the mobile classroom teachers provide activities for elementary school children. Demonstrations for school children and parents show how to measure and use low-cost foods in simple recipes such as milk punch and peanut butter cookies.

Teachers have held special classes at the request of the principal. An introductory homemaking class was thus offered to one sixth grade group. These students met two days a week in the mobile classroom studying grooming, health, diet, and interpersonal relationships. In this unit the teachers helped each student develop a better self-image.

Teachers led discussions for fourth graders on home economics careers. Simple basic foods, food preparation, and nutritional value were taught to special education students.

Various forms of educational media were used: filmstrips, movies, transparencies, teacher-made and commercially-sponsored handouts. Demonstrations are given by guests from utility companies as well as by the teachers.

In prominent view on the walls of the laboratory are food group charts in English and in Spanish. Individual food charts, booklets, various homemaking and consumer magazines, recipes for quick but nutritious meals, and assorted foods books are available on a reading table.

To evaluate the mobile classroom programs, the teachers make home visits and talk with the students. Students have called to report that the program has been helpful to them. Many students became so interested that they attended summer classes in a housing project halfway across the city.

The New RDA
Continued from page 6

Food and Nutrition Programs in Kindergarten and First Grade

Sophie Leavitt, Volunteer

I am a firm believer that through children, mothers will be reached; and through the mother, the whole family will profit. "Cooking nutritiously," in my book, means good, down-to-earth foods that people can afford and enjoy. If we can send a man to the moon, we should certainly be able to give our most precious "commodity," our children, a chance to learn to cook nutritiously to have healthier, better lives. Learning in school is preventive medicine; and starting in kindergarten is the first step in this direction.

My program was to volunteer my help for three months, once a week on Friday afternoons, because that's when the teachers need it most. (If you were ever a teacher, you surely know why.)

Motivation

What motivated me to teach and to write a booklet for kindergarten and first grade children? I couldn't sleep at night, worrying about all the things we teach our children, while we just don't have time to teach good cooking. We talk about nutrition; millions of words are written about nutrition. But! why are we not actually teaching nutritious cooking from K to 12?

With the help of Mrs. Lansing of the School Lunch Program of Palm Beach County, Florida, a few teachers in Canal Point started teaching kindergarten and first grade children to cook. They began with simple dishes such as mixing dry milk into "drinking milk," learning the value of milk—and chocolate milk, and "peanutty" milk—and getting acquainted with cheese. Children quickly advanced from the fun of eating an orange and learning what it does for you; and preparing raw fruit and vegetable snacks, to cooking.

One hardy teacher even prepared a Thanksgiving dinner with her children. The principal of the school told me afterward that the wonder and the thrill of the lovely smells that came from the turkey as it cooked to a luscious brown made everyone in school excited and interested. This "togetherness" gave a new meaning to "Thanksgiving."

Enrichment

Good cooking can bring such a variety of learning into a child's life. It can be a beginning of reading. It certainly deals with real life arithmetic. It opens up a world of geography and history—where the food is grown and how it gets to us. I cannot emphasize enough how much the children's knowledge is heightened and enriched in all directions; how "real life" this is; and perhaps—who knows—we might also be putting a little food into a hungry child's stomach—and in this case, the "right kind of food."

Involvement of Mothers

One of the kindergarten teachers told me what wonderful experiences she was having, not only in cooking, but also in introducing new foods into their lives and new experiences which they so badly needed. Mothers became very interested, and they too wanted to learn how to cook better. This particular teacher met with some mothers after school to talk and discuss food. They also prepared some recipes.

I have since become involved with older children and the "over sixty crowd," but my heart still belongs to the beginners—because they are the ones we must start with and then go step by step up the ladder from K to 12. How? In Florida this winter and in Pennsylvania this fall, we are going to do "cooking a la carte" to prove, hopefully, that we can teach children to cook good, old-fashioned foods nutritiously without breaking the school's bank and the superintendent's heart.

What happened to the Palm Beach program? The dedicated teachers, hopefully, are continuing it. Next school year, I'll go down the road from West Palm Beach to Canal Point, and then—I'll know.

functions other than as a precursor of niacin, it was assumed that the efficiency of conversion of tryptophan to niacin would change with changes in the tryptophan content of the diet. Nevertheless, until more information about factors affecting efficiency of conversion is obtained the current figure of 60 mg is accepted.

Age groupings in the table of allowances have been changed. All the allowances have been adjusted to fit the new age groupings. The broader age groups are considered more realistic than narrow age groupings which imply accuracy of knowledge of nutritional needs greater than is actually available. Also, the range of body weights within each year of age is frequently as great as the range of the averages for three- or four-year groups. The appendix of the eighth edition of the RDA gives information about weight ranges within each year. If it is necessary, the allowances can be adjusted for narrow weight ranges on the basis of body weight.

About the Author

Alfred E. Harper, Ph.D.

Dr. Harper, Chairman of the Department of Nutritional Sciences, and Professor of Biochemistry, University of Wisconsin in Madison, is also Chairman of the Recommended Dietary Allowances Committee of the National Academy of Sciences, National Research Council.

Dr. Harper, eminent in amino acid relationships, metabolic adaptations, and amino acid transport research, has been author and coauthor of many scientific articles and has contributed to numerous textbooks.

A native of Canada, Dr. Harper received his B.Sc. and M.Sc. in biochemistry at the University of Alberta, and his Ph.D. from the University of Wisconsin. He was on the faculty at the University of Alberta and Massachusetts Institute of Technology, as well as being at Cambridge University.

Dr. Harper has been active in professional associations in both Canada and the United States. He is a past president of the American Institute of Nutrition.

FOOD AND NUTRITION BOARD, NATIONAL ACADEMY OF SCIENCES-NATIONAL RESEARCH COUNCIL
RECOMMENDED DAILY DIETARY ALLOWANCES,[1] Revised 1973

Designed for the maintenance of good nutrition of practically all healthy people in the U.S.A.

	Age (years)	Weight		Height		Energy	Protein	Fat-Soluble Vitamins			Water-Soluble Vitamins							Minerals					
								Vitamin A Activity	Vitamin D	Vitamin E Activity[5]	Ascorbic Acid	Folacin[6]	Niacin[7] (B_1)	Riboflavin (B_2)	Thiamin	Vitamin B_6	Vitamin B_{12}	Calcium	Phosphorus	Iodine	Iron	Magnesium	Zinc
	From	Up to	(kg)	(lbs)	(cm)	(in)	(kcal)[2]	(g)	(RE)[3] (IU)	(IU)	(IU)	(mg)	(μg)	(mg)	(mg)	(mg)	(mg)	(μg)	(mg)	(mg)	(μg)	(mg)	(mg)	(mg)
Infants	0.0	0.5	6	14	60	24	kg × 117	kg × 2.2	420[4] 1,400	400	4	35	50	5	0.4	0.3	0.3	0.3	360	240	35	10	60	3
	0.5	1.0	9	20	71	28	kg × 108	kg × 2.0	400 2,000	400	5	35	50	8	0.6	0.5	0.4	0.3	540	400	45	15	70	5
Children	1	3	13	28	86	34	1300	23	400 2,000	400	7	40	100	9	0.8	0.7	0.6	1.0	800	800	60	15	150	10
	4	6	20	44	110	44	1800	30	500 2,500	400	9	40	200	12	1.1	0.9	0.9	1.5	800	800	80	10	200	10
	7	10	30	66	135	54	2400	36	700 3,300	400	10	40	300	16	1.2	1.2	1.2	2.0	800	800	110	10	250	10
Males	11	14	44	97	158	63	2800	44	1,000 5,000	400	12	45	400	18	1.5	1.4	1.6	3.0	1200	1200	130	18	350	15
	15	18	61	134	172	69	3000	54	1,000 5,000	400	15	45	400	20	1.8	1.5	1.8	3.0	1200	1200	150	18	400	15
	19	22	67	147	172	69	3000	54	1,000 5,000	400	15	45	400	20	1.8	1.5	2.0	3.0	800	800	140	10	350	15
	23	50	70	154	172	69	2700	56	1,000 5,000		15	45	400	18	1.6	1.4	2.0	3.0	800	800	130	10	350	15
	51	+	70	154	172	69	2400	56	1,000 5,000		15	45	400	16	1.5	1.2	2.0	3.0	800	800	110	10	350	15
Females	11	14	44	97	155	62	2400	44	800 4,000	400	10	45	400	16	1.3	1.2	1.6	3.0	1200	1200	115	18	300	15
	15	18	54	119	162	65	2100	48	800 4,000	400	11	45	400	14	1.4	1.1	2.0	3.0	1200	1200	115	18	300	15
	19	22	58	128	162	65	2100	46	800 4,000	400	12	45	400	14	1.4	1.1	2.0	3.0	800	800	100	18	300	15
	23	50	58	128	162	65	2000	46	800 4,000		12	45	400	13	1.2	1.0	2.0	3.0	800	800	100	18	300	15
	51	+	58	128	162	65	1800	46	800 4,000		12	45	400	12	1.1	1.0	2.0	3.0	800	800	80	10	300	15
Pregnant							+300	+30	1,000 5,000	400	15	60	800	+2	+0.3	+0.3	2.5	4.0	1200	1200	125	18[8]	450	20
Lactating							+500	+20	1,200 6,000	400	15	60	600	+4	+0.5	+0.3	2.5	4.0	1200	1200	150	18	450	25

[1] The allowances are intended to provide for individual variations among most normal persons as they live in the United States under usual environmental stresses. Diets should be based on a variety of common foods in order to provide other nutrients for which human requirements have been less well defined. See text for more-detailed discussion of allowances and of nutrients not tabulated.

[2] Kilojoules (KJ) = 4.2 × kcal

[3] Retinol equivalents

[4] Assumed to be all as retinol in milk during the first six months of life. All subsequent intakes are assumed to be one-half as retinol and one-half as β-carotene when calculated from international units. As retinol equivalents, three-fourths are as retinol and one-fourth as β-carotene.

[5] Total vitamin E activity, estimated to be 80 percent as α-tocopherol and 20 percent other tocopherols. See text for variation in allowances.

[6] The folacin allowances refer to dietary sources as determined by *Lactobacillus casei* assay. Pure forms of folacin may be effective in doses less than one-fourth of the RDA.

[7] Although allowances are expressed as niacin, it is recognized that on the average 1 mg of niacin is derived from each 60 mg of dietary tryptophan.

[8] This increased requirement cannot be met by ordinary diets; therefore, the use of supplemental iron is recommended.

Nutrition News

OCTOBER 1974 VOL. 37, NO. 3

Food Shortage—an Educational Challenge

By Georg Borgstrom, D.Sc.,
Professor Food Science and
Human Nutrition, and Geography,
Michigan State University

The immense inequities in our world are mirrored in terms such as Hunger Gap, Energy Gap, Water Gap, and Poverty Gap. In rapid sequence, crises in population, food, energy, paper, and so forth have been in the news. The choice of words is inappropriate; they indicate that we are dealing with episodes which will soon be overcome. These phenomena are not single, unrelated events.

We were reminded through the study, *Limits To Growth*, that we could not possibly continue our overdimensioned, accelerating overexploitation of capital resources, fuels, soils, water, forests, and metals.

The supreme test the world is currently facing is not the hypothetical future billions, but the needs of those now living on Earth, and of the one billion more which will be aboard our spaceship by the year 1985.

In relative terms Latin America is growing the most—Mexico is adding more people per year than the U.S.A., and Brazil more than the Soviet Union. Asia adds a new Japan each second year. The feeding burden of the globe is extended each third year by the increased population of an extra U.S.A. and each six years by another Europe. That "other world" is not on a fertility rampage, but is faced with almost half of its people below sixteen years of age. This not only constitutes a disproportionate nonproductive section of society, but a corresponding overload in growing demands on food supplies.

The urbanization avalanche is amassing 600 million people in cities in less than ten years under the false presumption that food and water will take care of themselves. Coupled with this, in both the rich and the poor world, is a crucial boggling of prime agricultural land.

Education in the food field has been missing the historical dimension. Between 1850 and 1950, western man's biggest migration in human history (75 million), blazed mankind's last trail. He thereby placed under his direct, or indirect, dominion more agricultural and forest resources than had ever existed in his own homeland of Europe.

The post-World War II period witnessed the big grab of the oceans—mankind's last frontier to fully exploit. The Soviet Union, Japan, and Europe deployed major long distance fleets to almost all fishing grounds of the globe, including those of the hungry world. A persistently growing percentage of the catches were, however, converted into fishmeal and oil—up to half the marine fish harvest—and channeled into the feeding troughs of the affluent world, thereby bypassing the malnourished millions.

The United States emerged as the biggest buyer on the world's seafood market. Altogether this has led to four-fifths of the ocean harvest ending up on our side of the Hunger Gap—one third of the globe's millions.

In January, 1974, the global reserve stocks of grain were at their lowest level in more than 25 years. In many places the storage bins are empty. Even the United States is beginning to see the bottom of the barrel. Hopes are placed in a good 1974 harvest, but even if this will be the case, it will not change the untenable situation that the entire world is almost wholly dependent on the weather, has no buffer stocks, and finds itself merely a year or two from a universal food shortage.

Drought, floods, and diseases have scourged key areas of the globe in recent years creating acute critical food shortages in all three of the deficit continents—Asia, Africa, and Latin America. To recognize that these realities can also occur in the affluent world is a major educational challenge.

A series of paradoxes characterizes the United States food scene. We have attained the top-ranking position of the world as a buyer of beef and shellfish products. This beef not only originates in Australia and New Zealand, but also in several Latin American countries. Yet the United States' total imports are less than one-tenth of our consumption.

With three pounds of tuna fish per person a year, the United States accounts for almost two-thirds of the world's catch of the involved species. This includes the tuna used for cat food. Fishing vessels of many nations supplement the catches of the United States' tuna fleet. The truth of the matter is that the oceans could not accommodate a second superpower in tuna of the U.S. magnitude.

Equally valid is the assertion that the Asian scene could not accommodate a second grand power of the Japanese format, which has only six percent of Asia's millions yet receives more than 40 percent of the cereal deliveries to that continent.

The United States' soybean crop has for too long been touted as a major contributor to the alleviation of world hunger. Yet strictly judged, only three percent of our exports, and around one-tenth used on the domestic scene enters into human food. Soybeans have become a cornerstone of milk, egg, and meat production for North America, Europe, and Japan. Only a pittance reaches the hungry world. The soybean protein that moves into animal production would in effect be adequate to supplement the diet of approximately 1.5 billion cereal-eating people. The corn-soybean mixture is a significant start along a road to adjustment to crucial global food needs. This is a paramount challenge to world economy, food technology, and not the least to education.

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Four issues annually: February, April, October, December

Nutrition Status in U.S.A.

The Health and Nutrition Examination Survey (HANES), draws on a probability sample, from the Bureau of the Census, to reflect the country's total population. Some 30,000 people in 65 separate sampling units (standard metropolitan statistical areas or rural counties) are being tested. With this design, estimates can be made for the total population, while permitting more analysis of data for certain groups at high risk of malnutrition.

Major purposes of the study are to establish data with which 1) to compare the results of future surveys, and 2) to provide basis for government food stamp and school lunch policies.

The exam includes: an estimate of caloric and nutrient intake based on 24-hour recall; blood and urine tests for vitamin and mineral content; a physical examination; and physical measurements to discover abnormal growth patterns and obesity.

The preliminary report details results of the first two tests, dietary intake and biochemical findings from 10,126 people. Findings include: 1) Widespread iron deficiency exists. About 95 percent of all preschool children and women of childbearing age have iron intakes below Food and Nutrition Board—National Academy of Sciences standards. Despite evidence of iron deficiency indicated by eating habits, only 10 percent of preschoolers scored low on iron when tested biochemically. However, blacks rated lower than whites on tests for hemoglobin and hematocrit, which are related to iron intake. 2) Most people have acceptable levels of calcium. Exceptions are black women of childbearing age. 3) The majority have acceptable levels of vitamins A and C. Poor white women of childbearing age are low in vitamin A. Low-income whites over 60 get less vitamin C than low-income blacks. The situation is reversed in higher income levels. White preschool children and women are more deficient in vitamins A and C than black preschool children and women. *Abraham, S., Lowenstein, F.W. and Johnson, C.L. 1974. Preliminary findings of the first health and nutrition examination survey, United States, 1971–72: dietary intake and biochemical findings. Rockville, Maryland: National Center for Health Statistics.*

Acquainting Parents with Nutrition Education

By Connie Dawson, Intermediate Grades Teacher
Robbinsdale Area Schools, Robbinsdale, Minnesota

In its continuing effort to keep parents interested in their schools, the Robbinsdale PTA Board chose to have a "Back to School Night." Parents were to come to school and participate in classroom activities taught by their child's teacher.

The question was WHAT TO TEACH
—that would be interesting and enjoyable;
—that had been recently taught their children;
—that had triggered the enthusiasm of their sons and daughters.
A "Big Ideas" nutrition unit met all requirements!

Mothers usually knew the nutrient group foods fell into, but they thoroughly enjoyed experiments that showed how foods are placed into categories according to nutrient content. A feather was burned to identify the odor characteristic of protein. Parents burned a variety of foods to find the same odor. Ash left from burned foods indicated mineral content. Starch, using iodine, and vitamin C, using a starch-iodine solution, were also identified.

An activity was used to classify foods into food groups according to nutrient content. Each food group was represented by a color-coded card. As packages and containers were drawn from grocery bags, parents displayed the appropriate colored card.

The students-for-a-night surveyed the nutrient patterns of foods, graphically illustrated on "Comparison Cards," to see if they could place them into one of the food groups.

A "Guide To Good Eating" poster listed the recommended number of servings from each food group. Using the nutrient and four food groups information, a daily menu was chosen that reflected a balanced intake of nutrients. The parents planned one "ideal food day," using the number of recommended servings of each food group.

The final "test" of the hour's learnings was the lunch-bag activity. The "parent-students" were told what they had eaten for breakfast. Each couple was then issued a lunch bag containing food models showing what they had eaten for lunch. The test, of course, was to shop for dinner from a long buffet table with food models arranged on paper plates. The parents selected the number of servings of foods to supplement their breakfasts and lunches to provide a day's balanced nutrient intake.

Parents finished the evening's activities with feelings of satisfaction and pride. It was only then that I realized that they had been feeling apprehensive about doing well in "Back to School Night!"

The "Big Ideas" nutrition unit is a joy to teach! All students (parents or children) learn about things that directly affect the quality of their existence. A fact that gives learning about nutrition a built-in importance. A great variety of experiential activities adds the critical dimension of DOING. Doing stimulates learning and fosters retention.

Each student has an equal chance of success—improvement of post-test over pretest score. Many students who have difficulty with other areas of the curriculum may experience success and have a chance to feel good about themselves and what they can do. Parents are extremely pleased to see their children develop an appreciation of nutritious meals and apply acquired knowledge to their daily food choices.

Nutrition takes on even greater importance in the total scheme of respect for the body, its proper nurture, and care, when taught in the science-health curriculum.

Teens "Get The Picture" on Nutrition

By Virginia I. Zirkle, County Extension Agent,
Home Economics, Putnam County, Ohio

Teenage boys and girls eating habits were a great concern to the Putnam County Extension Homemakers Council. Two major problems were seen: 1) "Selling" nutrition education to teenagers, 2) Attracting teens to a meeting.

A planning committee of adults and teenagers chose the theme "Fitness —Choice or Chance?" Plans were made to produce a film of the same title to use as one of the "gimmicks" for getting teenagers in a three county area together for a teenagers' nutrition program.

A group of high school students became actors; the plot—a scheme to help teens improve their diets, and the scene was a high school in Northwestern Ohio.

The movie camera rolled in and filmed teenagers "doing their thing" as they made food choices.

What did the camera story tell? It told the story of a high school cafeteria lunch line: the "picky eater," the "overeater," the "sweet-tooth" eater, the girl too interested in her newly found boyfriend to eat, the "hurry-up—I gotta get out of here" eater. It also showed those who went to a popular hamburger shop nearby.

Students tantalized the teens with promises to "see your friends in the movies" and "meet an Olympic star." Public address systems were used. Notices were sent to religious and youth groups. School buses helped transport the students.

A panel, composed of a teenage boy and girl, an Olympic star, a physical education teacher, and our Extension Nutritionist talked about what "feeling good means to me and the role nutrition plays in this."

For twenty minutes the teenage audience listened to what was being said about nutrition and its affect on how a person feels and looks. Why? Because the panelists were "one of their kind"; individuals whom they idolized, whom they wanted to resemble. The moderator, a State 4-H staff member, had them in the "cup of her hand" everytime she spoke.

The majority of Ohioans are engrossed in football every year. So another "gimmick" used to arouse interest was "see an entire football game in five minutes." An entire game was actually condensed into five minutes of film and was hilarious!

A traveling attendance trophy was presented to the high school having the greatest percentage of their students present. This program was planned to become a yearly event. If the same school received the trophy for three consecutive years, the trophy would become its permanent possession. One high school now proudly displays this along with its other trophies.

Many important elements were involved in this venture—planning; support of teachers, administrators, and respected adults; timing; teen involvement in all parts of the program; and publicity. No one factor alone accounted for the program's success. The film produced knowing laughter as the audience quickly caught the "there go I" idea. The program itself was effective as it played up the positive benefits of nutrition and fitness without "preachiness."

Students commented: "It was great to see an Olympic star in person!" "The speaker gave me something different to think about. I have a different idea of nutrition now." Parents reported: "My daughter is eating breakfast these days!" "I think she's really trying to eat more of the foods she should."

A lighthearted approach to eating problems can be an effective teaching technique. The 850 teens who attended are still talking about it!

Nutrition and Modern Civilization

Nutrition must become part of the effort to protect nature and the living environment. The end of the 20th century will burden man with rapid changes in his development marked by declines in physical activity, greater intellectual demands, and new types of physical and mental stress. Nutrition research will be needed to investigate energy and nutrient requirements under these new conditions. Nutrition problems of the elderly will be more evident due to increased numbers in older age groups. Modern living, through tensions, will put more load on the central nervous system. Metabolic requirements of this system need to be fully understood. Dietary patterns should promote man's adaptive capacity.

Technology and new foods should serve the needs of man in the new, advanced technical civilizations. Economics should combine the medical and health aspects of nutrition with new production methods, so food prices will reflect nutritive value and social importance.

Masek, J. 1974. Man and the trends of modern civilization. Ecol Food and Nutr 3(1):55.

National Nutrition Policy

The National Nutrition Consortium has prepared guidelines for a National Nutrition Policy. The Consortium recognizes that for maximum utilization of food, the individual must have a basic understanding of food and nutrition in relation to requirements for health, including information on the products he purchases. Nutrition information should be incorporated into all levels of formal education. Nutrition research, both basic and applied, is essential for solving current and future nutrition problems.

For the nation, a National Nutrition Policy should fulfill commitments to cooperate with other nations and world organizations in devising measures for providing adequate food for the expanding population. This includes maintenance of adequate world reserves of food, technical assistance, participation in world trade, and assistance in provision of foods in emergency situations.

National Nutrition Consortium, Inc. 1974. Guidelines for a national nutrition policy. Washington, D.C.: U.S. GPO

Food Shortage . . . Continued from page 9

Textured vegetable protein has largely been restricted to the affluent world and supports only a minor switch away from animal towards plant products. But this is a far less urgent matter on our Western scene than is the channeling of soybeans and other oilseeds into the global markets for world feeding.

Less than one-fourth of the world's milk production, and one-third of the meat production, is available to the poor countries' two-thirds of the globe's population. Tradition, climate, and technical shortcomings are conventional explanations. Little is it brought out that the livestock of the affluent world is on a collision course with the hungry millions of the poor world. Livestock compete in the world markets and actually devour two to three times more protein than the 2.7 billion people in the food-scarce world. Almost half the ocean harvests of fish, one-fourth of the milk protein, and two-thirds of the oilseed protein bypasses human consumption and is currently either wasted or channeled into animal production. In several affluent countries more nonfat milk solids enter into milk replacers than is consumed as milk. Also, casein goes into animal feeds. Oilseeds alone provide the global animal production with a larger amount of protein than what livestock and poultry totally supply to the world households. In the not too distant future, a high priority will therefore, by necessity, be given toward a far better utilization of world protein, as well as to a more equitable distribution of the harvests of both lands and seas.

In a world constantly getting more overcrowded, as well as more interdependent, man will be forced to a more energy-conscious economy, not the least in the food sector. This will greatly affect animal production. Milk production will stand strong in such an economizing setting, due to its more favorable conversion efficiency.

It is a major educational challenge to broaden the understanding of the food scene to the global horizons. We need to acquire a keener perception of the true foundation of our affluence, as well as the nature and magnitude of the immense prevailing crucial shortages, now critically aggravated by a growing maldistribution of key commodities.

We need to reformulate our goals on the domestic and international scene. Nutrition education can become the prime vehicle towards creating a new and better world.

About the Author

Georg Borgstrom, D.Sc.

Dr. Borgstrom is a recognized authority on world food resources, their utilization, and the balance of population and resources.

Dr. Borgstrom has written many books and articles—since 1973, *WORLD FOOD RESOURCES, FOCAL POINTS* (sequel to *THE HUNGRY PLANET* and *TOO MANY*), and *THE FOOD AND PEOPLE DILEMMA.*

Among Dr. Borgstrom's numerous awards are being the Outstanding Educator of America, 1971-72; and recipient of the Wahlberg Gold Medal, 1974, in recognition of lifelong, extensive research in world feeding and efforts to arouse world opinion about the basic prerequisites for human survival.

Errata

Although the Food and Nutrition Board sent National Dairy Council the Recommended Daily Dietary Allowances for inclusion in the April *Nutrition News,* we were not informed that more changes would be made. Note the following changes in the table:

Nutrient	*Category*	*Change RDA*	
		To	*From*
Vitamin E	Females 11–14	12	10
	Females 15–18	12	11
Ascorbic Acid	Lactating	80	60
Vitamin B_6	Males 15–18	2.0	1.8

Other changes were minor. They include: footnotes are lettered rather than numbered, publication date is 1974 rather than 1973, one-half is changed to half in footnotes, and some other hyphens are omitted.

Worth Reading

Food & Man, Second Edition. 1974.

By Lowenberg, M.E., Todhunter, E., Wilson, E.D., Savage, J.R., Lubawski, J.L. New York: John Wiley & Sons. $11.50

Dr. Lowenberg and her co-authors achieve their stated purpose "to stimulate the reader to begin to understand the vital importance of food and nutrition to everyone on earth . . . in his or her personal life as well as in the affairs of communities and nation."

The main concerns are: 1) problems in nutrition, 2) solutions currently being tried or projected to relieve hunger and malnutrition, 3) the background of these problems, and 4) the history of how man has fed himself and the knowledge of man's endeavor to understand the nutritive needs of his body.

Two new chapters on "Food Patterns, Origin and Development," written by Dr. Lowenberg, trace the development of agriculture and animal husbandry as it parallels the development of civilization. The new chapter, "Food, Man, and the Influence of Business," explores the food buying habits of today's consumer as influenced by business financing, production, and marketing. All chapters are brought up-to-date with the inclusion of new material.

Food & Man is intended to be used by college students who have no previous background in the physical or chemical sciences. As a textbook for a beginning food and nutrition course, it provides a basis for in depth study of food habits or nutrition.

Reliable, basic nutrition textbooks are suggested in the Appendix, as well as resource material to use for class enrichment.

Study questions and topics for individual investigations are included at the end of each chapter. References and suggested readings are listed in most chapters, as well as in the Appendix.

Food & Man touches on ecological reasons, as well as cultural, social, and personal, for the selection, preparation, and consumption of food. This account of man's experience with food will appeal to the general reader and college student alike.

Nutrition News

DECEMBER 1974 VOL. 37 NO. 4

Maternal Nutrition Since 1969 White House Conference

By Howard N. Jacobson, M.D.,
Professor
College of Medicine and Dentistry of New Jersey
Rutgers Medical School

Almost five years have elapsed since the White House Conference on Food, Nutrition, and Health pointed up the national crisis in maternal nutrition. It found there was no national policy and no governmental structure within which to develop policy recommendations. To spur federal consideration, the Conference's Panel on National Goals and Objectives for Pregnant Women issued the following statement:

"There must be a national affirmation that every woman has the right to high quality and high standard health care. This includes a food intake that will prepare her for and carry her through a healthy pregnancy and childbirth and permit her infant to flourish. It affirms that the right to adequate nutrition is an inseparable part of the basic right to health care and that women require and are entitled to sufficient amounts of nutritious food."

In the absence of long-term positive action by the White House, it remained for the Senate's Select Committee on Nutrition and Human Needs to raise the issues again. Its National Nutrition Policy Hearings of June, 1974, provided an occasion for reviewing the Panel's 1969 recommendations and assessing the progress made toward its goals.

The Senate hearings raised the same issues but this time hearings bore implications for health legislation under consideration by the Congress.

Reviewing the past five years, it seems clear that advances have been made on three major fronts:

1) supplementary food programs;
2) nutrition education; and
3) maternity leaves for working mothers.

In 1969 the Panel made two recommendations for the relief of malnutrition in families with limited food budgets. The first concerned the provision of supplementary food. The second recommendation was to sustain the family food purchasing power when pregnant women were unable to work.

The most significant current approach is the Pilot Program, Special Supplemental Food Program for Women, Infants, and Children (WIC), sponsored by the U.S. Department of Agriculture, Food and Nutrition Service, and initiated by the Select Committee on Nutrition and Human Needs of the U.S. Senate. As of May, 1974, there were 255 areas in the country which had received start-up grants from the Department of Agriculture. The WIC Program provides supplemental foods to infants and mothers in low-income rural and urban areas.

The University of North Carolina is presently studying 19 WIC Programs. Although it is too early to comment, there are emerging trends.

Programs are being started as rapidly as local circumstances and funding warrant. There are as many methods for supplementing the diets of women, infants, and children as there are programs. It is imperative to learn as much as possible from local experiments to assure their benefits will be reaped as a national health policy and program develop. Examination of the WIC Program's operations could provide a sound launching pad for the future.

An adequately staffed team can be assembled now to produce the background of administrative and operational information from the evaluation of WIC Programs being done by the University of North Carolina as well as from the natural experiments. Congress could then use the information from this significant pilot program to plan national nutritional programs for the future.

The Panel was concerned about the serious loss of income that a working woman incurs because of pregnancy. Temporary loss of income can have major impact on the family's ability to purchase sufficient and proper food and to receive adequate health care. Great progress has been made in liberalizing personnel policies relative to working women and pregnancy. Companies now offer mothers maternity leaves.[1] School boards do the same as a result of the Supreme Court ruling.[2] However, this aspect of family support has received too little attention.

The Panel singled out adolescent and teenage girls as requiring special attention since they are one of the most vulnerable population groups in our country. It is with this age group that the most visible improvements have taken place. For example, in 1968 there were 35 programs for pregnant school-age girls; by the end of 1970 there were 175 programs. In 1971 an interagency task force on programs for school-age parents was formed to operate nationally, and this group has become the Consortium for Early Childbearing and Child Rearing.

Although strides have been made, there is still uncertainty about this group of vulnerable girls. At a February, 1974, meeting in Massachusetts to plan statewide services, there was no agreement among knowledgeable professionals as to the number of such girls at risk.

Three important points brought out at the meeting were:

1) Current data are not available on the impact of abortion services available for the pregnant girl.

2) Because state and national statistics on pregnancies are slow to become available, attempts to plan for current problems are severely limited.

3) Fragmentary data suggest that serious problems may be emerging among the adolescent and teenage girl population, but the data are so anecdotal that sound judgments cannot be made. Nevertheless, the older school age girls may be the ones who seek abortions and the very young (15 years and younger) may not. What are the implications of such a

Continued on Page 16

Nutrition Needs During Pregnancy

Nutritional status, nutrient requirements, and physiological and biochemical norms are needed for all pregnant women. The fetus is not a true "parasite" extracting all nutrient needs from maternal stores. A sharing of some available nutrients occurs; thus the fetus is not completely protected in the presence of maternal nutritional inadequacies. A steady weight gain of 0.5 to 1.0 lb. per week is recommended; however more information is needed in individual circumstances. Nutrient requirements during pregnancy necessitate particular emphasis on energy, protein, folacin, iron, and calcium intakes. Many investigators do not advocate routine supplements of nutrients (with the possible exceptions of iron and folacin.)

Sodium intake for healthy pregnant women should not be discouraged, since normal physiologic adjustment to pregnancy increases the requirement for this electrolyte.

National Dairy Council. 1974. Nutritional needs during pregnancy. Dairy Council Digest 45(4):19 (July-August).

Protein and Energy Standards

Protein and energy standards were revised in 1973 by the Food and Agriculture Organization/World Health Organization (FAO/WHO) and the National Research Council-Food and Nutrition Board (NRC-FNB). Their energy recommendations are the same for infants and young children, but the FAO/WHO standards are higher for older children and adults. Both energy standards are similar to former recommendations except for pregnant and lactating women. Energy recommendations are increased for pregnant women.

Both new standards for protein are similar and lower than previous recommendations, except for pregnant women. The FAO/WHO based its higher protein recommendation for pregnant women on the theoretical amounts of protein deposited in the fetus, placenta, and maternal tissues. The NRC-FNB gave added weight to nitrogen balance data in recommending an additional 30 grams protein per day during pregnancy. A higher calcium allowance is also recommended to accompany increased protein intake.

Calloway, D. H. 1974. Recommended dietary allowances for protein and energy. 1973. J.Am.Dietet.A. 64:157 (February).

Forming a Group To Fight Quackery

By Stephen Barrett, M.D., Chairman, Board of Directors
Lehigh Valley Committee Against Health Fraud, Inc.
P.O. Box 1602, Allentown, Pennsylvania 18105

How We Began

In December, 1969, a small group of health professionals began to attack health quackery. Local medical, dental, osteopathic, pharmaceutical, podiatral, nursing, optometric, health service, and nutrition organizations were happy to send representatives, or help us locate members, who were interested in this area. An appeal to the local bar association brought several volunteer attorneys. By word of mouth, we attracted laymen with a variety of backgrounds—labor and industry leaders, teachers, ministers, and homemakers.

Several of the professional societies endorsed our group and donated money to help the Lehigh Valley Committee Against Health Fraud, Inc. The medical society allowed us to use its office equipment until we obtained our own.

We incorporated to make it clear that we were independent of sponsoring organizations. As we attracted publicity, we received financial support from individuals—mainly health professionals.

Currently, we have about 40 members whose interests, availability, and talents are quite varied. Some are seasoned political activists, both in and out of the health field. Some are excellent writers and public speakers. Some have much time to give, others have little. All share a deep sense of fair play and interest in our fellow man. As time goes on, each of us carves out his or her own niche in our action network.

What We Do

We invite people who feel they have been cheated in health matters to complain to us. We furnish speakers on a variety of health topics. We offer assistance to government officials and agencies. We organize letterwriting campaigns when misinformation appears in local newspapers or when pertinent legislation is being considered. We monitor pseudoscientific publications and health food stores, reporting misbranded products to government agencies. We write articles for lay and scientific publications. We stimulate media coverage, providing accurate information and attacking misinformation and its promoters. We exchange information, ideas, and publications with other groups and individuals. We support political candidates sympathetic to our views. We are editing a comprehensive study of health quackery.

What You Can Do

An excellent way to begin a program like ours is to form a reading group which meets once or twice a month. Discuss such topics as nutrition sense and nonsense, the history of quackery, the "organic" food fad, megavitamins, arthritis and cancer quackery, scientology, chiropractic, naturopathy, acupuncture, antifluoridation propaganda, health politics, and major promoters of health misinformation. As your knowledge grows, form a speakers' bureau. Let the media and other community groups know you are available.

As you study political forces and legislation affecting consumer protection in the field of health, your group may wish to write letters to publications and legislators. Because people seldom take the trouble to do this, a small group of individuals writing on a regular basis can make itself felt considerably out of proportion to its size.

Join Us?

Feel free to contact us if you have ideas, experiences, or publications to share, questions to ask, projects to design, or money to contribute. If you become active in this field, I am sure we can find ways we can work together.

Teaching Food and Nutrition to Children

By Harriet A. Stevens, Assistant Professor,
Department of Home Economics, University of Iowa

Working with food with young children is an integral part of "Nutrition Work with Children," an elective course for dental hygiene, elementary education, nutrition, or nursing students. The course is designed to acquaint students with principles of food selection and preparation which contribute significantly to the nutritional needs of young children. Students, individually or in groups of two or three, plan and carry out a food and nutrition project in a nursery school, day care center, or kindergarten.

The purpose of incorporating foods and nutrition in the preschool curriculum is interdisciplinary. The benefits for the children may range from simple, pleasurable sensory and social experiences to mind-expanding activities introducing chemistry and mathematics as well as nutrition. With careful planning, children become enthusiastic participants in all facets of food activities.

In planning a food activity, students are encouraged to work with a group of children with whom they are acquainted. Often the teacher helps in selecting four or five children to work together. Some children work together better than others; a child who might particularly benefit from the experience can be included, or an activity can be used to fulfill or extend the interests of a child.

Projects often consist of three parts: 1) initial exploratory experience, 2) food activity, and 3) evaluation (what did children already know; what was learned?). The project must fit the understandings and abilities of the children and build on past experiences. It must be compatible with the philosophy and the time schedule of the school.

Students may choose to have a series of six or eight lessons on a topic such as "about apples," "where milk comes from and how we use it," or "cereal grains." A series on apples might include a field trip to an orchard or preparation on different days of apple salad, apple bread, or applesauce.

The primary objectives are to select foods from the four food groups, and prepare foods that contribute nutritive value in addition to calories. There is minimal use of table sugar—in most cases none is used. Any nutritious food is suitable for a snack. Small servings of soup, raw or cooked vegetables, cereal grain products such as breads and muffins, cheese, meat spreads, and eggs are all used. Milk or juice is served with the snack. Cost is considered in planning. In some cases, the school has a budget for snacks and in others the cost is borne by the students.

Students are encouraged to become familiar with sources of educational materials and with the wide variety available. Innovative students make or create materials suited to their projects, such as original stories, songs, games, and plays. Charts for recipes are ordinarily in pictures because the children are not reading yet.

The instructor visits the schools and takes photographs of the various activities. These are useful in evaluation and are used as a "thank you" gift to the school. Teachers use the pictures for bulletin boards.

The projects are pleasurable activities for the children; they like to learn and like to cook. If a child has helped prepare a food new to him, he is more inclined to taste or eat it than if it is simply served to him. Their personal involvement in one of the dishes actually served at school is a serious business and a helpful one. One teacher has observed, when the "cooks" come from the kitchen and announce, "We made spinach souffle," it is a good day for everyone.

Adolescent Pregnancy

Diets of 30 pregnant and 32 nonpregnant adolescents of comparable socioeconomic status were evaluated for nutrient content. Diets of pregnant subjects compared less favorably with Food and Nutrition Board recommendations (1968) than diets of nonpregnant adolescents; however intakes of certain minerals and vitamins by the pregnant group were increased by nutrient supplements. Nonpregnant girls scored higher on the nutrition knowledge test and were judged better adjusted psychologically than pregnant girls. Diet quality, nutrition knowledge, values governing food selection, and personality adjustment appeared to be interrelated factors primarily in the non-pregnant group. Weight gains, during pregnancy averaged 26 pounds (range 15-43 lb.). This weight gain, considered high by some standards, may have been beneficial and perhaps accounted for no low-birthweight infants. None of the infants were premature. A satisfactory weight gain for pregnant adolescents remains to be determined.

Seiler, J. and Fox, H. M. 1973. Adolescent pregnancy: association of dietary and obstetric factors. Home Econ. Res. J. 1(3):188 (March).

Brain Development and Behavior

Brain development and consequent behavior evolves from an interaction of genetic and environmental factors. Of the latter, nutrition is concerned directly with providing energy and nutrients for cell structures and metabolic systems. During gestation neuronal growth is maximal. If the fetus is malnourished, resulting in low birth weight, or delivered prematurely due to maternal disability, brain growth may be affected. Compared to a child normal at birth, the underdeveloped newborn may grow slower, have more illnesses, and have limitations in brain development and behavior.

Two types of intrauterine malnutrition exist. A poor maternal diet before and/or during pregnancy can reduce the number of brain cells in the fetus. Also, placental insufficiency may change the activity of enzymes and alter protein content of the brain.

Committee on International Nutrition Programs. 1974. The relationship of nutrition to brain development and behavior. Nutr. Today 9(4):12 (J-A).

Developments in Maternal Nutrition. . .
Continued from page 13

trend for these very young mothers and for their children?

Because of the Massachusetts experience, state and national reporting systems should receive support to provide the necessary information on teenage pregnancies and abortion soon enough so that sound planning, monitoring of existing programs, and evaluations can be effected.

Education of the public, health professionals, and pregnant women on nutrition has improved significantly since 1969. Authoritative material on maternal nutrition has been distributed widely for both individual and group education. Besides national and state Departments of Public Health, voluntary agencies like the American Red Cross and the National Foundation—March of Dimes have produced educational and informative publications. Industry-related educational organizations such as the Vitamin Information Bureau and National Dairy Council and industries such as General Mills, Ross Laboratories, and Mead Johnson have also provided useful literature. One result has been the wider promotion of more permissive weight gains during pregnancy.

The education of health professionals on maternal nutrition has also increased rapidly. The Food and Nutrition Board of the National Research Council established a standing Committee on Maternal Nutrition in 1971. This led to the establishment of an effective Committee on Nutrition for the American College of Obstetricians and Gynecologists (ACOG), whose activities include preparation of an authoritative guideline for physicians on nutrition services for pregnant women.

Through wider use, recognition, and support of soundly prepared educational information already available, and through better use of existing professional Committees on Nutrition to develop legislation on maternal health and nutrition, and family planning, Congress can strengthen and encourage the present momentum.

One of the most pressing concerns stemming from the White House Conference is the recognition that standards and norms for pregnant women are lacking. Unfortunately, there have been almost no major studies done since mid-1950. Recommendations for dietary allowances are thus limited and any surveys of nutritional needs are extremely difficult to interpret. Therapeutic trials are also hampered. There will be many difficulties in estimating the benefits of nutritional programs for pregnant women as have already been experienced with the WIC Program.

Solidly based answers to these problems should help develop more realistic expectations in the realm of maternal health.

[1]*Bender, Marylin. 1973. Companies revising maternity leave policies. NYT. Dec. 10, p 61.*

[2]*Curran, William J. 1974. Pregnant schoolteachers–the right to bear children and the right to work. Law-Med Notes, New Eng J Med. 290:1005. (May 2).*

About the Author

Howard N. Jacobson, M.D.

Dr. Jacobson, Professor, Department of Community Medicine, College of Medicine and Dentistry of New Jersey—Rutgers Medical School, has been active in many committees and boards on nutrition including two White House Conferences; Committee on Recommended Dietary Allowances and Chairman of the Committee for Maternal Nutrition of the National Research Council.

After receiving his M.D. at Northwestern University, Dr. Jacobson has been with Boston Lying-In-Hospital, Harvard Medical School, University of California Medical Center, and others, as well as Rutgers.

His honors include Research Career Development Award and Associate Fellow, American College of Obstetricians and Gynecologists.

Dr. Jacobson has been the author or coauthor of over 50 medical articles or publications.

Dr. Jacobson gratefully acknowledges editorial assistance of Mary Nell Currie, Rutgers Medical School.

Worth Reading

The Malnourished Mind. 1974

By Elie Shneour. New York: Anchor Press/Doubleday. $6.95

The Malnourished Mind is a unique presentation of information from a wide range of scientific disciplines. It covers a host of theories from enzymes to Piaget, from the wild boy of Aveyron to intelligence tests, from the discovery of vitamins to the intrauterine environment.

Dr. Shneour's major thesis is that early-life malnutrition is a significant factor in shaping man's cognitive potential. Ninety percent of the adult brain size and development is achieved during the first four years of life. The author believes the behavior of human beings in generations to come can be substantially influenced by the massive problem of malnutrition affecting people throughout the world today.

This book reviews pertinent scientific information on early-life malnutrition and its consequences. References to the scientific literature enable the reader to examine the source of information instead of accepting at face value what is written.

Through educating more and more people about malnutrition and its effects on future generations, pressure can be put in the political sphere to do something about this enormous problem, says the author.

Dr. Shneour speaks to the general reader—not the specialist, believing that only an informed public can ultimately influence the course of human events.

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food and you . . . Partners in Growth . . . during pregnancy. 1974.
Chicago: National Dairy Council.

16 pages, 6½ x 3½ inches. 15c.

A booklet presenting information about the influence of nutrients on the health of women and their babies. Recommends foods to include in the daily diet to provide essential nutrients, emphasizing protein, iron, calcium, and vitamins A and C. Also included is a practical self-check sheet for evaluating the adequacy of the diet.

Nutrition News

FEBRUARY 1975 VOL. 38, NO

"Nursing Bottle Syndrome" Rampant Dental Caries In Young Children

By Abraham E. Nizel, D.M.D., M.S.D.
Professor of Nutrition and
Preventive Dentistry
Tufts University School of
Dental Medicine

Introductory Overview

This article is a plea to pediatricians, nurses, nutritionists, and parents to be concerned with the effect of early feeding habits on young children's dental health.

All health personnel should be aware of the causes of one of the most crippling dental conditons in young children, "nursing bottle syndrome." This condition is characterized by rampant decay of all the upper teeth and, in some instances, some of the lower posterior (back) teeth; but it never involves the lower anterior (front) teeth.

As the name implies, this syndrome is caused by direct contact of the teeth with sugar, syrup or honey sweetened water, milk, or fruit juice drunk from a nursing bottle. Usually these nursing bottles are used as pacifiers at bedtime by children who are much beyond the bottle-feeding age.

The family pediatrician, even before the family dentist, is usually the health professional to note the onset of dental caries first in infants. Therefore, he is in the best position to control and mitigate this problem by advising and admonishing mothers not to give their children sweetened beverages in the nursing bottle at bedtime. He is also in the best authority position to refer the child (at least by the age of two) to the family dentist for preventive dental services.

Nature of Dental Caries

Dental caries is a destructive process involving tooth enamel and dentin. The carious lesion is initiated in the enamel by acid decalcification (removal of calcium) and then proteolytic (protein decomposing) bacteria invade the dentin and destroy it. Decalcification and proteolysis cause cavitation.

Dental caries does not have a single cause; rather, it is a complex ecological disease. It is the result of an interaction of the resistance or susceptibility of the tooth with the demineralizing effects of organic acids produced by the fermentative action of plaque bacteria on sugar. Other factors such as frequency of eating, oral clearance of food particles, genetics, economics, systemic problems, and pre-eruptive nutrition can also influence dental health. Thus, simplistic solutions are never completely successful in dealing with this complex problem of caries. However, it is widely acknowledged that dental caries is primarily a local dieto-bacterial disease.

Incidence of Caries in Primary Dentition

About five to ten percent of children have some caries by the age of two. By three and four years of age, the incidence increases to 40 to 55 percent. And at age five, three out of four children have some carious primary teeth.[1]

A two-year-old has an average of 0.3 decayed and filled (DF) teeth; a three-year-old has 1 DF; a four-year-old has 2.5 DF; and a five-year-old has 4.6 DF. In contrast, a three- or four-year-old child with "nursing bottle" type rampant caries would have a 10+ DF.

How the Child Uses the Bottle

The child is usually lying down while holding the nursing bottle in his mouth. The tongue extends slightly out of the mouth and covers the lower anterior teeth. The beverage thus spreads over all the upper teeth and the lower posterior teeth, but not over the lower incisors, which are protected by the tongue.

Active sucking movements of the lips and cheeks increase salivary flow. This increase of saliva is significant because it washes away debris from the teeth and tends to promote the secretion of calcium, phosphate, and other bases which buffer plaque acids. But as the child falls asleep active sucking stops and therefore salivary flow and buffering diminish. The sugary beverage tends to pool around the teeth. Thus, there is continuous contact during the many sleeping hours between the sugary beverage and the bacterial plaque on the child's teeth. This simple carbohydrate is fermented to organic acids which continues to demineralize the tooth until it decays.

Consequences of Rampant Caries

The pain and discomfort from the numerous decayed and broken teeth will produce an irritable and fussy child. Teeth become abscessed and facial cellulitis (inflammation) can result.

If the carious crowns of the upper anterior teeth fracture or are extracted, a space will result. The child will tend to thrust his tongue into this space and thus develop the undesirable tongue-thrust habit which can produce malalignment and malocclusion of the permanent teeth.

In addition, there is the possibility that the child may develop a lisp or some other speech impediment. Of course, without incisors the child will not be able to enjoy the usual biting and chewing pleasures of firm foods.

Thus, the consequences of rampant caries in young children are discomfort, infection, unesthetic appearance, tongue-thrust habit, speech impediment, poor nutrition, and a great deal of needless financial expenditure.

Steps That Can Be Taken To Prevent Nursing Bottle Syndrome

Naturally, the most effective preven-

Continued on Page 4

Four issues annually: February, April, October, December

The Pediatrician and Dental Care

Pediatricians can uniquely contribute to dental health because they see children at an early age and because parents customarily accept their recommendations. Their role in caries control includes diagnosis, referral and preventive therapy. Preventive dental procedures can be initiated, and preventive dental education can be provided to the mother.

Although dental caries is a disease that begins early in life, because it is associated with certain defined factors, it can be controlled.

The carbohydrate component of the diet is associated with dental caries. The cariogenic potential of a given carbohydrate is influenced by chemical and physical properties, ability to stick to tooth surfaces, and frequency of consumption.

Daily systemic fluoride supplements should be used in areas where water fluoride content is below 0.7 ppm.

Altering the diet to render it less cariogenic and making tooth surfaces more resistant to acid attack through the use of fluoride are two potent mechanisms of prevention pediatricians can use.

Ripa, L. W. 1974. The role of the pediatrician in dental caries detection and prevention. Ped 54(2):176, (August).

Dental Caries and Sugar Substitutes

Unfortunately, few dentists consider sugar substitutes important in a preventive dentistry program. Restriction of sucrose intake to control caries is usually advised, without suggesting alternatives. Dietary habits are difficult to change, especially if the change requires the elimination of palatable, conveniently available foods. It is unreasonable to expect long-term dietary changes to be brought about by a dentist advising his patients during a single visit to restrict sucrose intake. This is even more difficult, considering increased use of sugar in convenience foods.

It will require the help and cooperation of food manufacturers to encourage the development and use of safe, noncariogenic sweetners. Such an effort by the food industry would contribute greatly to the realistic control and prevention of dental caries in the population at large.

Newbrun, E. 1974. The role of food manufacturers in the dietary control of caries. J Amer Soc Prev Dent 4(5):33, (Sept/Oct).

Nutrition and Its Value to Teenagers in Dental Health Education

By Mrs. Barbara Kelley
Dental Health Chairman
Nebraska Dental Auxiliary

The 1973-74 American Dental Association dental health slogan, "Kick the Sweet Snack Habit," motivated the Women's Auxiliary, American Dental Association, to be concerned about teenagers' eating habits as related to preventive dentistry. Each state's Dental Auxiliary was requested to submit a proposed program for use with teenagers. Our program, "Nutrition and Its Value to Teenagers in Dental Health Education," was planned with the assistance of Dr. Charles Meyer, Chairman of Community Dentistry, Creighton University, and the Program Director, Dairy Council of Central States.

The program focused on causes of dental cavities, the importance of oral hygiene, nutrients important for health (including dental health), and an assessment of personal eating habits.

With the consent of the school district administration, the principal of Westbrook Junior High, Omaha, Nebraska, was contacted. He arranged with the science department for student participation. Over 200 eighth-grade science students, in eight sessions, were totally involved in the pilot program during National Children's Dental Health Week.

Visual aids were used to explain the pH value that indicates the acidity or alkalinity of a given substance. In one test tube were broth, sugar, and Cresol Brom Purple indicator. The students saw that the pH was neutral because of its purple color. Another test tube with the same ingredients had added a swab stick containing bacteria found in the mouth. The bacteria fermented the sugar and turned the broth acid; thus, the indicator turned yellow. This signified to the students what transpires in their mouths.

Overhead transparencies were used to help show the composition of plaque, and the effect on acid production of the frequency of eating and the physical nature of sweet foods.

Teenage years are the period when nutrient requirements are highest. When nutrients are interpreted in terms of foods, we find that milk, fruit and vegetables need maximal attention because surveys indicate that consumption of these foods has been found to be inadequate, and that one-third of the adolescent's calories are eaten between meals.

Classes were divided into small groups, with Creighton University Dental Students serving as discussion leaders. Food Models were placed on each table and the science students, using a score card, selected foods they *thought* were high in protein, calcium, iron, and vitamins A and C. Students then referred to the back of the Food Models to find the actual percentages of the nutrients and charted them. A discussion followed on which foods were the best sources of each nutrient.

Another important activity was using an individual values clarification technique, whereby students listed twenty foods they had recently eaten. If they couldn't think of twenty, they listed some of their favorite foods. They were then asked to check foods: eaten frequently, eaten as snacks, those which adhered to their teeth, and those they thought contained sugar. Thus, the students gained insights into their own eating habits as related to their dental health.

In small buzz groups, the dental students, using tooth models, demonstrated tooth brushing and flossing. Regular checkups with dentists were stressed.

Each student wrote an evaluation of the program. After reading the student comments, we felt the interest was significant enough to promote this program in the other junior high schools in Omaha and possibly throughout the state.

Kindergarten Nutrition Project

By Mary C. Lawler, R.D.
Co-Chairman CICI Project

A nutrition-dental health project in twenty-four Arlington County, Virginia, schools was completed by volunteer members of the Northern District of the Virginia Dietetic Association. The program was part of a Citizens' Initiative Program for County Improvement (CICI).

A half-hour program to teach nutrition in dental health to kindergarten children within a $100 budget was a challenge. Special consideration was given to developing concise teaching aids so that the volunteers would need little advance preparation and could easily transport the materials. Large plastic carrying cases were made from heavy-duty plastic bound with book binding tape.

Fourteen posters of extra heavy, colored cardboard were used to show our nutrition story. Through colorful pictures of foods, cartoon characters, and appealing animal pictures the main ideas were presented. The children sat on the floor in front of the posters. The children's comments added to the dietitian's commentary.

On the first poster was a drawing of a boy and girl of kindergarten age surrounded by pictures of a wide variety of foods. Lines were drawn from the foods to the childrens' stomachs. It was stressed that all foods work together in the body. Another poster depicted a wide variety of foods being like a beautiful rainbow with good health being the pot of gold at the end. Other posters showed breakfast, lunch, and dinner meals.

The general nutrition posters were followed by comments on dental health. The dentist was portrayed as a good friend who wanted them to have healthy teeth which are needed for talking, chewing, and looking well. The dietitian was their friend also for she cared about what they ate.

A large, many-armed, plaque monster reaching for all the sweet foods showed the children what happens when they eat too many sweets and don't clean their teeth. A poster of large, yummy-looking, non-sweet snacks had a big hippopotamous in the middle who could gobble up all the good snacks. The hippo said he didn't eat sweets. The children were asked if they ever saw what the animals ate at the zoo. Many amusing and worthwhile comments followed.

Another poster showed what to drink when thirsty. There was a water fountain, all kinds of unsweetened fruit juices, and milk.

The children were then asked to guess snack foods the dietitian described with air motions and hints. Those who answered correctly put on small aprons decorated with pictures of the snacks. There were also sticks with artificial fruits on the end to hold. Children with aprons and sticks were to watch to see if the snack on their apron would be in the puppet show.

The puppet show featured Patty, a black puppet, Susie, and Jack. The puppet show started with piano music and singing. During the puppets' capers, taped children's voices discussing snacks were heard. The ideas first presented on the posters were again stressed. Two songs about food broke up the talking on the tape.

The teachers were very receptive and have promised to continue with activities stressing the main ideas: a) eat all kinds of food, b) eat few sweets, and c) brush teeth. Trips to supermarkets and lists of snack foods to bring from home are planned. Two schools asked to have the program presented in the first grade.

Mothers invited to attend the program were given hand-outs stressing the facts discussed. The children were given peanuts and coloring sheets of snack foods.

Nutrition and Oral Health

Nutrition influences dental caries and periodontal disease through resistance of the tooth or supporting structures to disease, the type and number of bacteria in dental plaque, and the oral environment. Adequate intakes of fluoride, calcium, vitamin D and protein are necessary for sound tooth formation. Bacteria causing dental plaque can be selectively influenced by changes in nutrition. The oral environment can be altered by changes in the composition of saliva. For example, a high protein diet may augment salivary urea level which in turn may neutralize acids formed by bacterial fermentation of sucrose.

The exact role of nutrition in periodontal disease is still debated. Nutrition may be more often a conditioning rather than a causative factor.

The dental health team is practicing preventive dentistry when individualized nutrition counseling is provided for patients. To provide the background for this service, applied nutrition courses are being introduced at many dental schools.

McBean, L. D., Speckmann, E. W. 1974. A review: the importance of nutrition in oral health. J Amer Dent Assn 89:109, (July).

Nutrients and Dental Caries

An adequate supply of essential chemical constituents of foods is crucial for optimal development of teeth and other oral tissues. Nutrients most closely associated with dental caries are the low molecular weight carbohydrate sugars such as sucrose. Sucrose not only promotes implantation of caries-inducing micro-organisms in the oral cavity but also acts as a substrate for the formation by micro-organisms of organic acids which act on the teeth.

Dietary proteins and fats may actually be cariostatic, although their precise role is not clearly defined. Milk casein may reduce enamel solubility by absorption to the surface of the teeth. Fats may exert their beneficial effect through some antimicrobial action and/or formation of protective film. The major role of fats in caries prevention is probably as a carrier for vitamins A and D, which are essential for normal tooth formation and mineralization.

Enwonwu, C. O. 1974. Role of biochemistry and nutrition in preventive dentistry. J Amer Soc Prev Den 4(5):6, (Sept/Oct).

tive step is not to put the child to bed with a nursing bottle. The natural sucking instinct of the child can be satisfied by a pacifier or thumb-sucking. The consequences of thumb-sucking are far less harmful than the nightly sucking on the nipple of a nursing bottle filled with a sugar-sweetened beverage.

If the nursing bottle is an absolute emotional necessity, then the selection of the proper type of beverage is critical. One should use plain milk or fluoridated water, not a sugar- or syrup-sweetened beverage. If a sugar-sweetened beverage is indispensable, then fluoride lozenge or drops should be added to mitigate the cariogenic activity of the sugar. Children under three should have a 0.5 milligram (mg) lozenge or five drops of 0.1 mg fluoride solution, above three years, one milligram lozenge or ten drops. (Fluoride should not be added if the water supply is already fluoridated.)

Research by Jenkins and Ferguson[2] shows that plain milk does not have local cariogenic effect. They showed that the milk in the milk-saliva mixtures prevented decalcification of enamel. This buffering activity of the milk was probably due to its calcium, phosphorus, and casein content. Weiss and Bibby[3] have shown that milk will reduce the solubility of bovine enamel in acetic acid-acetate buffer solution by about 20 percent at pH of 4.0. So plain milk can be recommended. Milk that might be considered to have cariogenic potential is that which contains a high percentage of added sugar.

Another step to prevent decay is to clean the child's teeth with a gauze pad after each feeding. This is to remove the sticky bacterial plaque and film on the tooth surface where the metabolism of sugar to organic acids takes place.

A third step is to make sure that optimal amounts of fluoride, one part per million, are ingested daily, either by drinking adequate amounts of fluoridated water or taking a fluoride lozenge regularly. This will stabilize the enamel's mineral structure making it relatively insoluble to organic acids.

A fourth step is to refer the child to the dentist for examination and preventive dentistry services as early as possible, but never later than two years of age, when all the deciduous teeth are usually erupted.

Conclusion

The responsibility for preventing and controlling the nursing bottle syndrome really rests on the shoulders of the pediatrician. He needs to be cognizant and truly concerned about this matter and to take some rigorous steps to deal with it. One step might be to exert his authority by routinely referring his two-year-old patients to the dentist for dental care just as the obstetrician routinely refers the pregnant mothers. Then the proper chairside and counseling preventive dental services will be instituted so that this destructive and disabling dental condition, "nursing bottle syndrome," will be another children's disease of the past.

1. *Finn, S. Clinical pedodontics, p. 537. 1957. Philadelphia: W. B. Saunders Co.*
2. *Jenkins, G. H. and Ferguson, D. B. Milk and dental caries. 1966. Brit Dent J 120:472.*
3. *Weiss, M. E. and Bibby, B. G. 1966. Effects of milk on enamel solubility. Arch Oral Biol 11:49.*

About the Author

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Dr. Nizel with a Doctor of Dental Medicine and a Master of Dental Science from Tufts University, and postdoctoral work in nutritional biochemistry at M.I.T., is currently Professor of Nutrition and Dentistry at Tufts University School of Dental Medicine, and Visiting Professor of Nutrition and Metabolism at Massachusetts Institute of Technology.

Dr. Nizel is actively involved in nutrition education for dental schools, research on nutrition and dental caries and plaque, and maintains his dental practice. He has been engaged in the practice of dentistry for 34 years and in teaching and research for 22 years.

He is a fellow of the American College of Dentistry and a member of numerous professional and scientific honor societies.

Dr. Nizel has authored over 50 publications, three books, and an audio-tape on dental nutrition.

Worth Noting

By Abraham E. Nizel

Nutrition In Preventive Dentistry: Science and Practice, 1972, by Abraham E. Nizel, is written for dental practitioners who have either not had a nutrition course or one relevant to dentistry. Philadelphia: W.B. Sanders Co. $13.

Nutrition Counseling for Dental Caries Prevention, 1973, by Dr. Nizel, is a cassette tape for use in counseling caries susceptible patients, also available from W.B. Saunders Co. $22.50.

From National Dairy Council:

Do You? poster and miniature for primary grade children focus on the importance of cleaning teeth, visits to the dentist, and foods for good dental health. Feature: statement of approval, American Dental Association. Poster*, 25¢. Poster miniature, 1¢.

Food and Care for Dental Health presents reference information about the relationship between food and dental health. Feature: statement of approval, American Dental Association. 16 pages, 20¢.

For Good Dental Health, Start Early describes ways in which parents can help their preschool children have the best dental health possible. Feature: statement of approval, American Dental Association. 12 pages, 10¢.

Have a Happy, Healthy Smile! is a full-color poster designed to stimulate discussion among intermediate grade children. Reverse side depicts permanent teeth and tooth structure. Miniature has spaces for student labeling of teeth and tooth parts. Feature: statement of approval, American Dental Association. Poster, 30¢. Poster miniature, 2¢.

How Teeth Grow text and artwork show how the health of an expectant mother can influence the development of her child's teeth before birth. Feature: statement of review, Council on Foods and Nutrition, American Medical Association; and statement of approval, American Dental Association. 5 pages, 7¢.

*Teacher/Leader Guide available.

Nutrition News

APRIL 1975 VOL. 38, NO. 2

Nutrition For The Elderly Of Today And Tomorrow

By Donald M. Watkin, M.D., M.P.H., F.A.C.P. Chief, Nutrition Program, Administration on Aging, Office of Human Development, Department of Health, Education and Welfare

INTRODUCTION

Optimum nutrition for those already old differs in many respects from that for the younger or unborn in a manner analogous to the way curative medicine differs qualitatively and quantitatively from preventive medicine. The seeds of many of the crises of today's elderly were sown years ago, from the time of their conception onward through their inappropriate health and nutrition practices. The management of their crises of today (analogous to curative medicine) is a humanitarian and political top-priority matter. But of equal priority is the prevention of premature physiological aging and the prevention of the diseases and disabilities of old age, lack of both having created the crises whose management now is caught in the national spotlight.

THREE PRINCIPLES

Optimum nutrition for persons now 60 years of age and older is not describable in slogans, cliches, one-minute commercials, hour-long talk shows, and certainly not in these few columns. Three principles, however, if intelligently and diligently applied, can result in optimum nutrition among those 60 and over. Persons in this age range cannot be treated as a homogeneous group.[1] The passage of time alone results in gradual decrements in the number of functioning cells.[2] Furthermore, as time passes, each person compiles a history of disease and disability—physical, emotional, and attitudinal—which is unique.

First Principle

The above reasoning underlies the first principle: optimum nutrition for each person 60 or more must be determined for that individual alone. This principle suggests that panaceas are inappropriate and that attention to individual needs is imperative. It implies that education is an essential ingredient in any nutrition program (see third principle).

Second Principle

This principle derives from the fact that malnutrition among North American elderly today is secondary to disease and disability—physical, emotional, or attitudinal.

Diagnosis and treatment of the pathology must accompany efforts to improve the elderly person's health by changes in diet. For example: an elderly person—weak, pale, and emaciated—is found to consume a diet low in iron, calcium, protein, calories, and B-complex and fat-soluble vitamins. Physical examination reveals a bleeding, annular carcinoma of the rectum. Medical treatment combined with modifications in diet and appropriate education will result in increased weight, strength, and disappearance of the anemia. In this example, dietary changes *per se* would have accomplished nothing; combined with appropriate diagnosis and treatment of the tumor, and nutrition education, improvement in the diet produced a desirable outcome.

Much pathology in the older person is emotional. Not only may mental illnesses, long compensated during the active life of maturity and late maturity, become clinically evident in the retirement years, but also new pathology related to physical disease, drastic reductions in living standards, a sense of rejection by society, and a diminution in self-esteem may lead to withdrawal, isolation, paranoid fears, and, of course, malnutrition. Since malnutrition *per se* may cause mental illness, e.g., the dementia associated with niacin deficiency, it is understandable that malnutrition compounds existing emotional disturbances.[3]

Often pathology is attitudinal, not truly neurotic or psychotic. Too many elderly with sterling records of accomplishment use pride as a reason for rejecting such problem-resolving institutions as Social Security, Supplemental Security Income, Medicare, Medicaid, public housing and subsidized housing, and even the national Nutrition Program for the older Americans. Modification of attitudes which are themselves destructive is essential to the success of any policy designed to improve the health and nutrition of the elderly.

The above reasoning underlies the second principle: diagnose and treat the underlying pathology while simultaneously improving the nutrient intake of the elderly.

Third Principle

This principle may be simply stated: educate the elderly in the realms of health, nutrition, gerontology, and consumer protection. Meeting the challenge is less simple; however, experience to date in the Nutrition Program for older Americans proves that it can be done.

The need for education in health and nutrition is implicit in principles one and two. Education in aging as a biological, psychological, social, and economic process has been lacking. Correcting this deficiency enables the elderly to understand interrelations among health, nutrition, and aging in themselves and, importantly, in younger cohorts whose future welfare demands all the understanding and support which present-day elderly can provide for research and service programs in aging.

Education in consumer protection should include a vigorous assault on medical quackery, food faddism, nutrition misinformation, and deceptive advertising. Through education, the false promises of their purveyors can be ex-

Continued on Page 8

four issues annually: February, April, October, December

The Nutritional Environment

Malnutrition is widespread among the aged, and latent deficiency diseases are not immediately apparent. Thus a thorough nutritional evaluation, including nutritional history, clinical evaluation, and laboratory tests, is necessary. This provides the diagnosis for recommendation to slow the aging process, or at least provide a more satisfactory health status.

The concept of individuality, when applying the RDA, has particular relevance for the aged. Many aged have one or more chronic illnesses (i.e., atherosclerosis, malabsorption conditions, rheumatism, osteoporosis, obesity, alcohol addiction, lack of teeth, and other ailments). Nutritional needs represent individual problems. A common problem for the elderly is a gradual development of apathy toward the environment generally, and particularly toward food. Food choices become narrowed, and a balanced diet of foods from the four food groups is not always maintained. Diagnosis and correction of this malnutrition can prevent diseases of the elderly from developing to their full proportions.

Krehl, W. A. 1974. The influence of nutritional environment on aging. Geriatrics 29(5):65 (May).

Continuing Need for Calcium

The long-term effect of inadequate dietary intake of calcium, relative to losses, is demineralization of the skeleton (osteoporosis). Even a slight imbalance, over a long period of time, can cause sufficient mineral loss to produce mechanical instability of bone and conditions favoring fractures. Approximately 30% of women over the age of 55 and men over the age of 60 have sufficient mineral loss to produce fractures.

Dietary surveys of patients with osteoporosis indicate these individuals consumed diets lower in calcium than age-matched groups without bone demineralization.

Long-term studies with calcium supplements have shown that once the fracture has occurred, osteoporosis can be slowed, but not reversed. Furthermore, efficiency of calcium absorption decreases with age. Preventive therapy in the form of adequate calcium intakes should be instituted in youth and maintained throughout life.

Lutwak, L. 1974. Continuing need for dietary calcium throughout life. Geriatrics 29(5):171 (May).

Our Tribute To Older Citizens

By Mary R. Aebly, Assistant Professor of Education, Eastern Washington State College, and Mrs. Karen Chapman, Third Grade Teacher, Medical Lake, Washington

An opportunity for student and master teachers to experience success with nutrition education has been provided by Selected Concepts for Educational Nutritional Training (SCENT), a pilot study at Eastern Washington State College.

Two success stories linked third-grade classes to nutritional needs of older citizens.

One student teacher, with the cooperation of her master teacher, planned with the class to invite senior citizens to a special luncheon prepared by the children. The invitation explained that as part of their nutrition unit, the class wanted to prepare an inexpensive, nutritious luncheon and present a program about nutrition suggestions appropriate for the older citizen.

The master teacher, student teacher, and children planned a menu around food groups. Open-faced sandwiches, fruit salad, celery and carrot sticks, homemade ice cream, and graham cracker cookies were selected.

Girls and boys prepared the meal in the classroom. When their guests arrived, a short program of rhymes and charts about each of four food groups, emphasizing the importance of choosing nutritious food from each group, was presented by children wearing costumes of foods.

Children served the meal, which cost less than 50 cents per person, and ate it with their guests.

Another class cooperatively planned a Valentine luncheon for grandparents. A third-grade reading group shared a story about a young boy inviting some adopted grandparents to a party in his class. These third-graders were so intrigued by this story they wanted to have a nutrition party to host grandparents. Those who did not have grandparents decided to adopt someone to invite to a luncheon. Students decided on a menu of sandwiches, fruit salads, (some children commented that their grandparents couldn't digest the roughage of tossed salads), potato and jello salads (contributed by willing parents who became involved with the project), dixie-cup ice cream, and valentine cookies made by the class. Small valentine nut cups were made during an art class and filled with a few cookies, candy, and nuts.

The school cafeteria was eagerly decorated by members of the class after school. Other classes agreed to eat in their classrooms so the lunchroom would be available for the party.

As grandparents arrived, children practiced introduction skills and guided their "special" grandparent on a tour of the building. Children seated and served their guests, then sat and chatted with them during the meal. The class presented the story which had led to the party, and a short musical interpretation of it. The luncheon program was concluded after grandparents shared their thoughts about the nutritious luncheon.

Previous classroom discussion on osteoporosis and the need for calcium created concern as all children observed that few grandparents drank milk.

The third-grade class president's grandmother sent a written thank you for the fine luncheon, what the group learned about nutrition, and the warm welcome. The pride in the eyes of these young children was evidence of a successful approach to nutrition.

Follow-up lessons included reading about other foods and bringing new foods to taste.

Third-grade students were able to understand such basic concepts as these: people value food more often for taste rather than nutritive content, good nutrition can be obtained at low cost, milk is basic for a healthy diet at all ages, and diets need to be continually looked at to insure good nutrition.

Is it possible to modify behavior by having senior citizens interact with today's youth in nutrition education situations? Teachers and students in this SCENT project certainly hope so.

Focus on Nutrition in Family Daycare

By Natalie D. Crowe, Human Resources Program Coordinator, Cooperative Extension and Associate Professor, College of Human Ecology, Cornell University; and Barbara Pine, Cooperative Extension Specialist—Family Daycare

A sign in the window of a storefront in downtown Roosevelt, Nassau County, N.Y., invites anyone who takes care of children to stop in, with the children. A cheery room lined with shelves full of toys and books invites children to play.

If there's a baby in the group, the senior citizen aide assigned by a senior citizens' program, offers to hold, cuddle, and rock it. With the children happily engaged, the child care-giver can relax over coffee on the couch in the corner and visit with a member of the staff who will listen to her concerns, tell her about this unique Cooperative Extension program for anyone who takes care of other people's children in her home. Care-givers are usually called babysitters or family daycare mothers.

When the storefront opened in December 1972, no one really knew who was taking care of children in home situations.

Cooperative Extension was challenged to try to identify and reach this forgotten, isolated, and often unknown segment of the population who were sharing with parents the role of the child's first and most important teacher and care-giver. Knowing that parents and care-givers can help a child learn how to learn, and feeling that with increased knowledge comes increased responsibility for providing all children with what they need for sound growth, Cooperative Extension sought and obtained funding for a pilot program.

The objectives are three: 1) to reach and to design with family daycare mothers a training program to focus on needs as these care-givers perceive them; 2) to test the feasibility of Cooperative Extension as friend and trainer of family daycare parents and care-providers; 3) to see if Cooperative Extension can link family daycare parents into the existing community support network.

Extension Nutrition Aides working in the community help to identify care-providers and invite them to classes at the storefront. The weekly meetings focus on a variety of topics in early childhood education with emphasis on the home as a special place where children can learn.

Children learn most effectively when they are actively involved. A daycare home can provide many opportunities for children to develop all of their senses through experiences with food. Children can assist in selecting and preparing food. They can experiment with tastes and smells, discover how things grow by planting seeds, learn new words, and new skills. At the Resource Center, daycare parents learn how to provide these experiences for the children in their care.

In New York State, family daycare providers are required to serve at least one nutritious meal and two snacks daily. In reality children often arrive at the daycare home before breakfast and leave after dinner, eating all of their meals with the daycare family. To help daycare parents meet these special demands, the extension home economist and aides have, on several occasions, demonstrated planning and preparing economical and nutritious meals and snacks. As soon as school is out, school-age children stream into family daycare.

In 1973, the Family Daycare Program obtained the support of the USDA summer lunch program in Nassau County, which provided nourishing box lunches. Two-hundred-seventy childen in over 40 daycare homes in the Roosevelt community received a total of 10,680 lunches in summer 1974, twice as many as in 1973. The lunches were taken to the park or on planned outings.

As a result of this pilot program, a group of daycare parents in another community organized an association to participate in the summer lunch program. Nutritional needs of children in family daycare are being recognized and met.

Feeding the Elderly Heart

Treatment of the elderly cardiac patient should not be limited to the heart alone. Other factors demand attention [i.e., psychic stress (depression), nutritional deficits, and physiologic imbalances]. Dietary guidelines should: guard against increased carbohydrate intakes which exclude other nutrients; provide adequate high-quality protein intake to supply essential amino acids; caution against excessive dietary fat restriction; include foods such as eggs, lean meats, milk products, as excellent sources of protein, calcium, vitamins, and needed calories; provide adequate amounts of all vitamins (i.e. the B-complex vitamins important for energy metabolism); allow for adequate calcium intake, via milk products or supplementation; supply necessary iron for proper hemoglobin levels; and consider fluid and electrolyte balance.

Nutritional programs for the aged, cardiac patient should be on an individual basis, rather than by mass prescription, to allow for appropriate modifications.

Kupers, E. C. 1974. Feeding the elderly heart. J. Am. Ger. Soc. 22(3):97 (March).

Aging and Nutrition

Nutrition and aging interact in at least three ways: (1) aging, with decreased income, increased disabilities, and loneliness, interferes with good nutrition; (2) malnutrition is involved in the development of diseases associated with old age; and (3) the exact relationship of nutrition to the aging process is not fully understood.

As a person ages, most nutrient requirements continue; however, caloric needs decrease because of decreased physical activity and decreased cell mass. This decreased need for quantity of food means the quality of the diet must be higher than for younger, more active people. Nutrients such as protein, calcium, and iron are needed by the elderly at levels at least as great as in younger age groups. Biological availability of dietary vitamins may be reduced by diseases, or diets limited in variety. Sufficient roughage and water must be provided to maintain regularity.

The population must be educated concerning what can be done to prevent diseases of old age through better diets and/or supplementation.

Mayer, J. 1974. Aging and nutrition. Geriatrics 29(5):57 (May).

posed, the incredible waste they involve can be revealed and eliminated, and the realism and self-esteem of the elderly can be maintained or restored.

Summary

By applying these three principles, competent professionals can develop the total programs required to provide optimum nutrition for the elderly of today. In summary, they require: (1) attention to the needs of the individual; (2) diagnosis and treatment of underlying pathology with provision of appropriate nutrition; and (3) education in health, nutrition, gerontology, and consumer protection.

NUTRITION AND AGING

Optimum nutrition and health care from conception through late maturity are essential. Evidence is compounding that maternal health and nutrition during pregnancy (4) and infant health and nutrition during the first two years of life (5) are directly proportional to the quality of life in subsequent years. In addition, health care and nutrition in the early and middle years of life influence the susceptibility to chronic illnesses so prevalent among today's elderly. Appropriate nutrition combined with health care throughout life prior to old age gives man the opportunity to make the most of his genetic potential.

A ROLE FOR TODAY'S ELDERLY

Concern for younger age cohorts by today's older Americans, rooted in experience and expressed in lobbying efforts backed by votes at the polls, is precisely what is now required to further the research and service programs dedicated to improving the aging of all. A greater understanding of aging (as a biological process) and environmental factors (nutrition joined with health care is definitely under man's control) may most positively influence aging in man.

SUMMARY FOR THOSE NOT YET ELDERLY

Prevention of premature physiologic aging and of the diseases prevalent among the aged of today can be achieved through concern for nutrition and health care from conception onward. Research (to reveal what is still unknown) and service delivery systems (to apply what is already known) are keys to prevention of premature physiologic aging and of the diseases of old age. Support for such research and service delivery systems must come from those already old.

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About the Author

D. M. Watkin, M.D., M.P.H., F.A.C.P.

Dr. Watkin has been an assistant or associate professor of medicine, nutrition, and biochemistry, and associate editor of Nutrition Reviews and the American Journal of Clinical Nutrition.

He served ten years as a Senior Investigator in the National Heart and National Cancer Institutes and later with the Pan American Health Organization as an Adviser in Nutrition in Latin American. Since 1966, he has served in various professional roles with the Veterans Administration.

Dr. Watkin was Vice Chairman and later Chairman, Technical Committee on Nutrition, White House Conference on Aging, and currently is Chief, Nutrition Program, Administration on Aging, Department of Health, Education and Welfare.[1]

Active in numerous professional organizations, Dr. Watkin has authored or coauthored 86 articles in scientific/professional journals, and presented 194 papers at scientific/professional meetings.

1. *On detail from the U.S. Veterans Administration*

Worth Noting

For Senior Citizens

To Your Health . . . In your second fifty years, an easy-to-read, eight-page booklet with large type, provides guidance in planning, selecting, and preparing nutritionally sound meals, on a limited income during advanced years. National Dairy Council. 12¢. (Request No. B028.)

Nutrition Books For or About Teenagers:

Making Health Decisions, 2nd ed., by B. C. Gmur et al, 1975, includes four main concepts: nutrients, energy balance, health hazards with excess weight, and hazards and costs of self-treatment. It emphasizes nutrients as the basis of the four food groups. Englewood Cliffs: Prentice-Hall, Inc.

Investigating Your Health, 1974, by B. F. Miller, et al, emphasizes that everyone needs a balanced diet chosen from the four food groups to supply essential nutrients. Maintaining your ideal weight through diet and exercise for optimum health and good looks is stressed. Boston: Houghton Mifflin Co.

Let's Talk About Food, 1974, American Medical Association, edited by P. L. White and N. Selvey, includes explanations of the Recommended Dietary Allowances; U.S. Recommended Daily Allowances; nutrition labeling; seven group "Daily Food Guide;" adequate diet; weight control; nutrients; sense, half-sense, and nonsense. Excellent reference book providing information for individuals of all ages and lifestyles. Acton, Massachusetts: Publishing Sciences Group, Inc.

Teenage Nutrition and Physique, 1974, by R. L. Huenemann, et al, will prove helpful to professionals planning programs designed to maintain health of teenagers through improved nutrition and increased physical activity as related to weight control. Springfield: Charles C. Thomas.

Life Science: A Search for Understanding, 1971, by W. R. Brown and N. D. Anderson, discusses nutrition from the fertilized egg's need for nutrients through nutritional analysis of the student's diet, using the four-food-group system; to world's food supply problems. Philadelphia: J. B. Lippincott Co.

Nutrition News

OCTOBER 1975 VOL. 38, N

The Role of the Dairy Cow in Meeting World Food Needs

By K. E. Harshbarger, Ph.D.,
Head, Department of Dairy Science
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The anticipated increase in population during the last 25 years of this century can be expected to place critical demands on the food production resources of the world. With earth's limited land resources, a time must come when the production of additional food on a given land area will be very difficult, if not impossible.

Land Resources

Based on FAO estimates, only about 11 percent of the world land area is utilized as permanent crop land. Another 22 percent is used for permanent pasture and meadows, and about 30 percent is covered with forests. About 27 percent is not available for agricultural production. Some of the land now classified as grassland or permanent pasture may be shifted to crop land by making major investments in reclamation and irrigation projects. The high costs involved and climatic limitations restrict the potential conversion of grassland to crop use.

Plant Resources

Plants utilize soil nutrients, water, carbon dioxide, and solar energy to produce food for humans and animals. The seeds of wheat and rice are primary sources of food energy for people. By-products of wheat and rice, and the forage parts of food crops, are available for animal feeding to produce additional food.

The need to balance the food supply on a world-wide basis by shipping cereal grains to the food-deficit areas has received much attention during the last few years. In 1971 approximately 43 percent of the wheat and 15 percent of the corn produced in the United States were exported. It has been estimated that 85 percent of exported feed grains is actually used for livestock production. In effect then, land in the U.S. is supporting livestock production in other countries to upgrade their diets with animal products. As the cost of energy increases, higher shipping costs should tend to encourage the export of livestock products rather than bulky feed grains.

Animal Resources

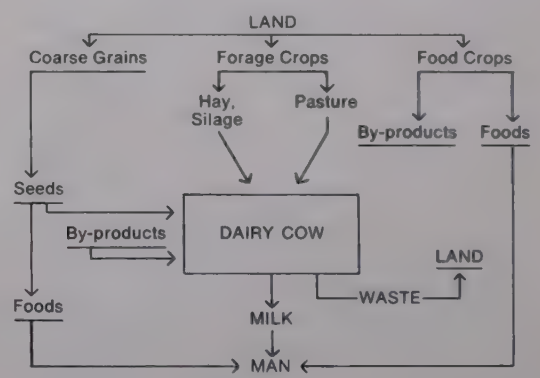
Animal products have been a part of man's food supply for thousands of years. Cattle were domesticated about 5000 years ago for a more reliable food supply, animal power, and other purposes. Now, with a critical food shortage facing the world, the competition between man and food-producing animals for the available crop foods needs to be critically evaluated. Animals must be utilized which are able to convert materials non-edible to humans to high-quality, essential nutrients in order to reach maximum world food production.

Ruminant animals, such as the cow, possess a unique digestive system which is able to convert inedible plant materials to human food in the form of milk and meat.

Efficiency of the dairy cow in relation to other animals in the utilization of land and feed resources for the production of more food is presented in Figure 1.

About 60 to 65 percent of the feed nutrients used for milk production comes from forages or fibrous feeds. By-products from the processing and refining of food crops for human consumption can be utilized to supplement forage and reduce the need for feed grains. For example, dried beet pulp from the manufacture of sugar can be fed to dairy cows. After milling wheat seed, only about 40 percent of the original energy and 36 percent of the original protein produced by the plant remain for human consumption. Thus, the nutritive values in the by-products from the milling process and, to a limited degree, in the wheat straw can be recovered by the cow.

Figure 1. Utilization of land resources for milk production.



Basically, the proportion of a specific plant nutrient recovered in the animal product has been used to express the biological efficiency of conversion of crop nutrients to human foods. Estimates of the efficiency of protein and energy conversion by various classes of livestock are presented in Table 1.

Table 1
Efficiency of Livestock in Converting Feed Nutrients to Edible Products.[a]

Class	Efficiency of conversion, %[(a)] Protein	Energy
Nonruminants		
Broilers	23	11
Turkeys	22	9
Hens (eggs)	26	18
Swine	14	14
Ruminants		
Dairy Cattle	25	17
Beef Cattle	4	3
Lambs	4	—

[a]Based on lifetime production and feed consumption.

Food-producing animals which can efficiently convert roughage and food crop by-products to high-quality human food must be used for the benefit of mankind.

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World Food Situation Study

This study was designed to analyze and inform the public about patterns, from 1952-1972, of world food production, consumption, prices, and trade, and the effect of these patterns on the world food situation during 1972-1974.

Projections of the world food supply and demand to 1985 are outlined along with differences among developing countries. Factors that will affect trends to 1985 include grain reserve levels, nutritional requirements, food aid, resource availability for producing food, weather, and demand for food.

The conclusions reached were: 1) factors causing the present world food situation are largely transitory and can be corrected; 2) food supplies will remain tight and prices high for the next year or two, although in the longer term, more food can be produced per person; 3) substantial malnutrition will probably persist among low-income groups in developing countries necessitating special national and international programs to help those most seriously threatened.

Economic Research Service, USDA. 1974 (December). The world food situation and prospects to 1985. Washington, D.C.: Foreign Agricultural Economic Report No. 98, USDA

Institutional Solution to Food Crisis

The most critical problems in expanding world food production will be in less developed countries (LDC's). Yields can be increased by use of non-land inputs: fertilizers, pesticides, improved seeds, water, and often machinery. Three conditions must be met before farmers in LDC's increase their use of these inputs: technology must be invented and farmers must know how to use it effectively and have price incentives to use it efficiently.

The extent to which these conditions are satisfied depends on the institutional structure within which the farmer lives and works.

A well-defined mechanism to motivate public institutions to increase public investments in new technology, for social rather than economic gain, is needed to increase food production in the LDC's.

Crosson, P. R. 1975. Institutional obstacles to expansion of world food production. Science 188:519 (May 9).

Alternate Protein Source Comparisons

By Mrs. Joy Veverka, Home Economics Teacher
San Diego Academy, National City, California

With increasing emphasis being placed on protein, calories, and cost of food, it is important to teach students how to choose and prepare alternative sources of protein.

To encourage use of new or alternate sources of protein, students are asked to bring a meat, fish, or poultry loaf or casserole recipe from home. Vegetarians and lacto-ovo-vegetarians are asked to contribute their favorite recipes. Choosing from a wide range of textured soy or gluten products in the supermarket, each student substitutes an alternate protein for the meat in the recipe. The original recipe may need to be altered slightly with additional eggs, bread crumbs, or seasonings to achieve a firmer texture or better taste.

At this point, students compute calories, grams of protein, and cost for both original and new recipes.

Students prepare both their original and alternate recipes in class and serve them for a buffet luncheon. Beside each dish on the buffet table is a copy of the recipe, and a listing of calories, grams of protein, and cost. The protein substitute label or package is also on display in order to familiarize students with it.

Students are encouraged to taste and evaluate the new foods prepared. The evaluation form consists of such questions as: "Does it taste like the original recipe? Is the taste pleasing? Is it a new taste? Is the texture similar to that of the original recipe? Is the texture pleasing? Does it look like the original recipe? Is the appearance appealing? Which tastes better, the original or the new? What other uses can you think of for this substitute product? Do you have any suggestions for improving the product?" The evaluations are discussed in the following day's class period.

In the next food preparation class, each student substitutes a dairy or legume protein source, such as natural or processed cheeses, cottage cheese, tofu (bean curd), nuts, and different kinds of beans. Once again, they sample and evaluate their newly developed recipes at a buffet luncheon. During the succeeding class period results and reactions are discussed. Students can then select entrees wisely, basing their choices upon taste, calories, cost, and amount of protein.

In a class with limited time, a variation of the above plan requiring only two class periods can be used. It could also be used with a younger age group. Students make up their own recipes for protein patties. The recipe consists of any three cups of the following products: bread crumbs and nuts, cheese, cottage cheese, tofu, garbanzo beans, lentils, soy protein, or gluten products. The three cups selected are added to ½ cup chopped onion; 4 or 5 eggs; 1 teaspoon thyme, sage, or other savory herb; 1 teaspoon salt; and ½ teaspoon monosodium glutamate. All ingredients are combined, dropped by spoonfuls into hot oil, and browned on both sides.

Students can select a recipe, and compute calories, protein, and cost during one class period. In the next class session, students can prepare recipes. Because patties cook much more quickly than casseroles or loaves, the students can immediately evaluate them in class. Patties can be served buffet-style with cheese sauce, mushroom sauce, and gravy available. Beside each dish are placed the recipe, and a list of calories, cost, and protein content. Evaluation questions include: "Which recipe had the best taste? Which recipe had the best texture? Which recipe contained the highest amount of protein? Which recipe contained the least amount of protein? Which recipe contained the highest number of calories? Which recipe contained the lowest number of calories? Which recipe was the most economical? Which recipe was the most expensive? Did any recipes have a new taste?"

In these experiences, while learning nutrition, students become acquainted with new foods and enjoy being creative in making their own recipes.

A Picture of Health

By Mrs. Kyllikki Kauttu, Editor
Finnish Medical Journal, Helsinki, Finland

Finland's second largest city, Turku, planned something different for World Health Day 1974. Instead of having Very Important People make speeches about "Better Food for a Healthier World," opinions of the citizens of tomorrow were asked. Opinions which would be expressed, not in speeches or even in writing, but in paint and artistry.

So the idea of a painting competition was conceived in Turku. Since Finland's new program for health education starts teaching facts about food in the first and second grades, the competition was declared open for artists aged seven and eight.

Three art teachers drew up the competition rules, suggested seven themes on nutrition, and made sure that all teachers in the area were aware of the contest and were urging their pupils into action.

Public health nurses toured the schools to explain to classes what healthy food means, how it helps us, and why it is important for adults as well as for growing children. Children discovered that different foods nourish in different ways and that their daily diet needs to include a variety of foods in varied quantities. They realized that nutrition is rather more than just food.

The children of Turku needed no further encouragement. Some 4,000 of them settled down with huge enthusiasm to illustrate healthy, everyday food.

Each class—both pupils and teachers—selected the three best pictures. The entries were judged for their artistic arrangement and for effectiveness in putting across the message of "Better Food for a Healthier World." This preliminary selection reduced the "field" to 400 pictures from which a jury of health experts and teachers picked the best.

To seven-year-old Päivi Vuorela went the first prize for his vivid painting of "Peter, the Happy Apple Muncher," which left no one in doubt that Peter's good humor and bright red cheeks were due to fruit in his diet.

Second prize went to Harri Lempiäinen for his gay and colorful picture "Mansikki Likes the Taste," showing how the cow keeps healthy and gives good milk by eating vegetables.

Of the 67 paintings accepted for exhibition in connection with the other World Health Day activities in Finland, 21 were awarded prizes. Grownups who came to see the display were encouraged to think about healthy food by being invited to vote for their choice of "best picture on show."

Since many of the children's parents and friends had not had an opportunity to see the entries, a Turku bank lent its window space and entrance hall for three weeks for the art exhibit. The children agreed to present their colorful and cheerful pictures to the city. The best were framed and distributed to health offices, health centers, and schools.

Health education as envisaged by children is positive, happy, and bright with color. It does not consist of restrictions and prohibitions—but very positive statements of our bodies' priorities and the joy of eating.

The painting competition reversed the usual roles. Children became the teachers and, without inhibition or prejudice, reminded adults of healthy nutrition habits. One important message was the emphasis that young artists put on fruits, vegetables, and roots—food-stuffs that are not only colorful and of distinctive shapes, but also represent a rich store of vitamins, by comparison with the usual, heavy Finnish diet of fats and carbohydrates through the long, dark winters.

The competition also gave a boost to a campaign by the country's dentists to declare only one "sweets day" a week. On the other days, snacks must be limited to the better alternatives of carrots, nuts, green vegetables, and fruit.

World Health Day in Turku helped to stimulate a new interest and a new outlook—that is still going on.

Milk Production Efficiency

In this study variation in use of digested energy for milk production was considered in terms of prediction of milk yield, energy requirements of cows in various physiological states, and energy value of specific feedstuffs.

Factors that determine milk-producing ability include genetic status, nutritional history, and stage of lactation. Level of nutrition and type of diet determine the nutrients available for milk production.

The total dietary energy requirement is separated into that needed for 1) maintenance of the nonproducing cow, and 2) production of milk. The energy requirement for milk production is proportional to the amount of milk produced.

Difficulties associated with predicting the digestibility of specific feeds and diets are discussed. The efficiency of digestion changes with 1) increasing dietary intake, and 2) the nature of the total diet. Energy values of specific feeds are provided in table form.

Moe, P.W., Tyrrell, H. F. 1975. Efficiency of conversion of digested energy to milk. J. Dairy Sci. 58: 602-610 (April).

Build Food Reserves; Limit Consumption

Population growth is regarded as the principal and most compelling threat to the survival of man. Consequences of population growth are described, particularly the instances in which food supply to one or more regions will become grossly inadequate. Unfortunately, great increases in food production have not occurred where the population is growing most rapidly.

Today, nutritional status is rarely the consequence of ignorance. Malnutrition reflects lack of food, not lack of scientific understanding.

Building a "world food bank" is possible if peoples of developed nations limit their consumption and if all affluent nations join together to purchase excess grain. The burden to provide capital and technical assistance to enable less developed countries to feed themselves falls upon the industrialized world.

Handler, P. 1975. The state of man. War on Hunger 9:9 (February).

Milk Production in the U.S.

In the United States and other temperate zone countries, milk has been an important part of the national diets, providing a large amount of high-quality protein, calcium, phosphorus, and riboflavin, and a moderate amount of vitamin A, and energy or calories.

The amount of milk produced has increased slightly in recent years on a world-wide basis and has remained relatively stable in the U.S.

However, in the last 30 years, as new knowledge in genetics and inheritance, and of feeding and management of dairy cows was applied, feed efficiency in U.S. milk production increased about 54 percent.[1] This increased efficiency of milk production saved about 50 billion pounds of total digestible nutritents, or the equivalent of 1.1 billion bushels of corn per year. Even though more grain was used per cow, each cow produced a greater quantity of milk; therefore, the total feed resources used for milk production were reduced.

Production in Developing Countries

Under adverse conditions in animal production, these efficiencies of conversion of feed by animals are not obtained. For instance, less than optimum biological efficiency is obtained from livestock production in the developing countries where these animals are scavengers. Developing countries maintain about 60 percent of the world's livestock, but produce only 20 to 30 percent of the world's livestock products.[3] In these countries where the milk supply is very limited, the average diet tends to be low in calcium, protein, and riboflavin. Thus, major changes in upgrading livestock management systems in developing countries are needed to improve efficiency of food production.

In some developing countries special dairy production projects have been established to increase milk production. The increased milk is used to nourish recently weaned children and to improve the protein quality in the diets of their people. With greater economic development and full utilization of feed resources, milk production can be expected to increase substantially in many developing countries.

Future Role of Dairying

The future role of the dairy cow in world food production appears favorable because:

1) The dairy cow efficiently converts roughage, food crop by-products, nonprotein nitrogen, and feed grains to a high-quality human food.

2) High-quality milk protein effectively balances the amino acid patterns present in plant proteins.

3) Milk is a critical source of nutrients for most infants and children as well as adults.

4) Mechanization in the dairy industry can increase productivity.

5) Dairying favorably effects conservation of land resources by using forage crops, preventing soil erosion, and returning animal manure to the land to maintain fertility.

Only by managing our land resources to assure ourselves of a continuing food supply can we protect the current and future generations. Individually, and on a world basis, man must accept the responsibility for planning his future to utilize world resources and establish stable systems of agriculture.

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2. *Ruminants as food producers. Council for Agricultural Science and Technology, Special Publication No. 4, March, 1975.*
3. *A hungry world: the challenge to agriculture. Summary Report, University of California Food Task Force, July, 1974.*

About the Author

Kenneth E. Harshbarger, Ph.D.

Dr. Harshbarger, Head and Professor, Department of Dairy Science, supervised the development of the outstanding research facility for feeding cows automatically at the University of Illinois. He has also served on the faculties of the Center for Human Ecology and of Nutritional Sciences.

Dr. Harshbarger, as a special consultant to the Committee on Nutrition, National Institutes of Health, participated in international nutrition surveys in the Philippines, Thailand, Jordon, Nigeria, and El Salvador.

Worth Noting

Nutrition and Our Overpopulated Planet

By Sohan L. Manocha. Springfield: Charles C. Thomas. 1975.

Dr. Manocha's concern is evident as he focuses on the intimate relationship among nutrition, population, and the food distribution task of feeding the masses of today and tomorrow. He points out that it is imperative that we learn to get maximum nutritive value from increased agricultural and aquacultural technology, mechanical energy, agricultural chemicals, and that we halt population growth.

Calories and grams of animal and plant protein per day in the diets of rich and poor nations are compared and the question of how to improve diets is discussed. Production of plant and animal foods throughout the world and their nutritive value are reviewed as the author assesses the need and basis for formulating processed foods in view of earth's limited resources.

Nutrient needs of infants and children, adolescents and adults, the aged, the obese and the malnourished are discussed in detail with an explanation of how they can obtain maximum nutritive value from existing food sources.

Education is stressed as the key to control population, improve nutrition, reorient concepts of a nutritious diet, and distribute food supplies equitably.

Although Dr. Manocha states that his book is "directed to the thinking people of all socio-economic strata in all countries," it is college-level reading. **Nutrition and Our Overpopulated Planet** is an informative, well-organized, indepth analysis of the world food situation and also a standard nutrition text.

Two 1975 revisions of recognized nutrition texts which have been expanded to include world food concerns and economics are:

Robinson, C.H. **Basic nutrition and diet therapy, 3rd ed.** New York: Macmillan Publishing Co., Inc.

Wilson, E.D., Fisher, K.H., Fuqua, M.E. **Principles of nutrition, 3rd ed.** New York: John Wiley & Sons, Inc.

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Contributions of Microorganisms to Foods and Nutrition

By Marvin L. Speck, Ph.D., William Neal Reynolds Professor of Food Science and Microbiology, North Carolina State University

Roles of Microorganisms

Microorganisms perform essential roles in aspects of man's existence, such as the fixation of atmospheric nitrogen for the growth of plants, the production of foods for direct human consumption, the production of antibiotics, and the disposal of organic waste materials.

For the preservation and processing of foods, man has used various microorganisms for centuries. Cheeses, wines, fermented vegetables, etc., were the result of natural interactions between raw foods and microorganisms which allowed man to preserve the raw food for extended periods of time.

Acids undoubtedly are among the most important preservative compounds produced when microorganisms bioconvert foods into fermented or cultured products.[1] Lactic acid is the primary acid produced by most of these cultures.

As man has used cultured foods in his diet he has consumed vast quantities of the lactic acid bacteria in foods such as buttermilk, yogurt, cheeses of various types, sauerkraut, pickles, cured meats, and other foods that depend on the controlled actions of various microorganisms for their production. Lactobacilli have been reported to produce various antibiotics.

Lactobacillus in Digestive Tract

Certain lactic acid bacteria have established a beneficial ecological relationship with humans which begins at the time of birth and persists throughout life. Especially important among these microorganisms are the lactobacilli. Soon after birth the digestive tract is colonized by a variety of microorganisms.[2] Among the first present are the lactobacilli which originate in the maternal vagina during birth of the child. During puberty Döderlein's bacillus, which is considered to be identical with *Lactobacillus acidophilus*, establishes itself as a predominant vaginal microorganism. In addition to its microbial interactions, it provides inoculum to the infant during birth.

As a consequence of breast feeding a stable microflora develops in the intestinal tract within several days. The microflora of the infant's fecal contents consists mostly of *Lactobacillus bifidus* (bifidobacteria). There is a drastic reduction or even absence of putrefactive bacteria which had colonized the intestinal tract before breast feeding began. In infants being bottle fed, the fecal microflora is more typical of that of the adult.

The stomach contains only a few indigenous microorganisms. The predominant flora in the small intestine has recently been reported to be *Lactobacillus acidophilus*. The ileum (last section of small intestine) is colonized with bacteria that are representative of those in the colon but in fewer numbers. The largest number of microorganisms in the intestinal tract occurs in the colon. There is some variation in the microflora of different age groups; that of adults is the most stable.

Need for Research

The needs for information on various activities of the intestinal microflora outweigh existing knowledge of specific roles. Relatively little is known about changes in the microflora resulting from changes in dietary intakes. Metabolic activities of intestinal bacteria have been associated with cancer of the colon. It has been hypothesized that carcinogens were produced from dietary components, or from intestinal secretions produced in response to the diet. However, much research is needed to establish actual causal mechanisms of cancer in spite of suggestive evidence linking the intestinal microflora with cancer.

Fermented Milk and Cholesteremia

A very interesting study has recently been reported on the relationship between fermented milk in the diet and cholesteremia in a Maasai tribe. After a diet, primarily of meat for two days, 24 warriors, aged 16 to 23 years,[3] ate only fermented milk made with a wild culture of a *Lactobacillus* for three weeks. Half consumed milk to which a surfactant (emulsifier) had been added. The study was designed primarily to determine the effect of a dietary surfactant on cholesteremia, but the greatest impact from the study was that serum cholesterol was reduced. The surfactant had only a minor, if any, influence on cholesteremia in the men. Average daily fermented milk consumption was 8.33 liters. Eight of the men increased their weight by six or more pounds and their cholesterol decreased an average of 28 mg per 100 ml; 16 men gained five or less pounds and showed a cholesterol decrease of 8.19 mg per 100 ml. The authors concluded that the fermented milk furnished a factor(s) that impaired the synthesis of cholesterol and thus led to a lowering of serum cholesterol level. It would appear possible, however, that with such a massive intake of lactobacilli the intestinal microflora could have been very drastically altered which degraded bile acids or cholesterol and promoted their excretion in the feces. Obviously more information is needed on the relationship of the intestinal microflora to functions that may affect cholesterol levels.

Increasing Dietary L. acidophilus

At the turn of the present century, a theory was proposed by Metchnikoff that inhabitants of the Balkan countries had

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Yogurt Controversy

The pros and cons of the controversial issue of whether yogurt should contain living bacteria are discussed. The favorable arguments include evidence that lactobacilli in yogurt can 1) regenerate the intestinal flora after antibiotic treatment, 2) create conditions in the intestines that diminish the number of disease-causing bacteria, 3) play an important part in the development of non-specific immunity reactions, as in germ-free animals, and 4) increase the concentration of certain vitamins.

The opposing arguments include evidence that 1) it is unlikely that yogurt bacteria can survive the acid stomach conditions and bactericidal action of bile secretion in the small intestine, 2) vitamins contributed by intestinal bacteria are mostly useless in higher organisms, and 3) heat-treated yogurt has good consumer acceptance and longer keeping quality without the living bacteria.

Kroger, M. 1975. How do you want your yogurt, with or without bacteria? Cult. Dairy Prod. J. 10(2): 18 (May).

Starter Cultures

Microorganisms ferment milk sugar (lactose) to lactic acid and/or produce the characteristic flavors in buttermilk, sour cream, and yogurt. Production of acid and flavor in buttermilk and sour cream is a coordinated activity between the acid- and flavor-producing starter cultures added.

The tart, high-acid characteristic flavor of yogurt is produced by lactobacilli grown with a moderate acid-producing streptococcus, which can produce acid at high temperatures. Experts agree that a high-quality yogurt with pleasant taste contains a 1:1 ratio of lactobacilli to streptococcus, and, for optimum results, the ratio should not be greater than 3:2 in the final product.

Regular intake of acidophilus yogurt ensures seeding of the bowel with a desirable flora which may help control intestinal disorders, and may help restore the normal balance of intestinal flora after antibiotic treatment of patients.

Vendamuthu, E. R. 1974. Cultures for buttermilk, sour cream and yogurt with special comments on acidophilus yogurt. Cult. Dairy Prod. J. 9(1):16 (Feb.)

Nutrition and Regional Foods Cookery

By Euna Smith, Junior High Home Economics Teacher, Tulsa, Oklahoma

To honor the birth of our nation and acquaint ninth-grade home economics students with the historical background of various types of foods and diet deficiencies, an American Heritage Nutrition Unit was developed. A study of this type (1) helps students of different cultures to better understand one another, (2) increases their nutrition knowledge, and (3) promotes pride in their heritage.

The Unit also stresses that most foods are available throughout the United States through the invention of the Mason jar and tin can, mechanical refrigeration, flash food freezing, and jet aircraft. Since these have nearly eliminated climate variations and boundaries, it may be more meaningful to say that America's eating habits are now national instead of regional.

The Unit's most important aspect was showing that a nutritious diet can be eaten by only modifying rather than changing the life-style of ethnic and geographical groups. Typical area menus can be analyzed, by use of food groups.

For instance, the Mexican-American diet may provide adequate amounts of the meat and bread groups (tacos, enchilladas, etc.) but still be deficient in milk and vegetables. But Southerners, who eat a variety of foods, might be healthier if they ate fewer fried foods. Black students learn that most soul food menus are adequate for growth and maintenance but may be high in starch and calories. Many are surprised to learn the important contributions of African women who cooked on Southern plantations. They introduced okra, boiled turnip greens, dandelion greens, and cooking with a bit of fat pork or ham to produce highly flavored, nutritious vegetable dishes. Creole cooking was also influenced by African cooks who used filé powder (powdered sassafras leaves) and okra as thickening in gumbos, thick soups, and stews served with rice.

It was challenging to search out the origins of our foods, keeping alive our rich and vibrant heritage.

Students were encouraged to use their own ideas to carry out a theme related to one of ten geographic regions. Research done by each student to obtain historical background information revealed that necessity inspired many original recipes. Two informative books for this Unit are "Red Flannel Hash and Shoo-Fly Pie," by Lila Perl, and "American Cookery," published by our nation's home economics teachers.

A large map of the United States was displayed with the related area circled and labeled as it was being studied. A typical meal from each region was planned, prepared, and served with different students responsible for each area. On serving day, students brought items of interest from their own travels and experiences.

Many popular songs have regional connotations, and a record player provided background music when appropriate. The class even dressed according to the dictates of the locale being honored.

Each meal and its preparation were evaluated by the entire class. In most cases students were quick to point out the need for a missing nutrient or a more desirable method of preparation. Much additional class cooperation and organization was necessary when both research and laboratory work were involved.

By the end of the Unit, the students were familiar with such festive dishes as cowboy stew, shoo-fly pie, red-flannel hash, apple pan dowdy, shrimp creole, clam chowder, and other locally famous foods. Nutrition was more enjoyable when the origin of regional dishes was used as a motivational factor. Nutrition learning was increased and the understanding of American customs and folklore instilled appreciation for the pioneers of our country. The study of history and geography combined with knowledge of colorful community festivals, family traditions, and ethnic backgrounds, can serve to assure the American Heritage of future citizens.

Food and Nutrition Minicourse

By Shirley M. Picardi, Doctoral Candidate, Department of Nutrition and Food Science, Massachusetts Institute of Technology

The "Food and Nutrition Minicourse" for 11th and 12th graders, developed at the Massachusetts Institute of Technology, funded by the Nutrition Foundation, is a four-to-five week learning package dealing with principles of food composition, health, and nutrition labeling.

High school students have difficulty applying previously learned Four Food Groups information to choice of foods they like to eat, which are often fortified, fabricated, or "nontypical." They also are bored by traditional nutrition education approaches, and need more personal involvement to stimulate interest.

The subject matter centers around a "Drive-in" hamburger meal, a Macrobiotic meal chosen at the most restricted level (number seven) of the diet regimen, a Four Food Groups meal, and a Vegetarian meal. Although these four meals are specificed in this unit, the general approach is applicable to other representative meals chosen for study.

The lecture-discussion sections deal with nutrients in food, their chemical determination, and use of food labels and food composition tables. Health consequences of nutrient deficiencies and excesses are emphasized. The four meals are used as examples in each of these sections.

In the laboratory, chemistry experiments are integrated with rat-feeding studies. Students are divided into four groups, and each group chemically analyzes the water, carbohydrate, fat, and protein content of one meal. The percentage of water, dry matter, fat, carbohydrate + protein, calories per 100 grams, and percentage of calories from fat are calculated. Growth rate, development, and behavior of weanling rats are compared in a 3-week feeding study to test the biological efficiency of each meal. The rats on the Macrobiotic diet fail to gain weight, have sparse fur, a hunched-up posture, and are initially greedy—later refuse to eat and throw food. Jumpiness and nervousness occur in rats on both the Macrobiotic and "Drive-in" diets. Occasional diarrhea and refusal to eat are observed in the rat on the "Drive-in" diet.

At the conclusion of the unit, students should appreciate the important contribution of a varied, moderate diet to health and normal growth; have sufficient knowledge to select such a diet from a variety of foods; and be able to identify obvious and implicit differences between food products, and make rational diet choices by comparing nutrition label information. The students should also understand how common food fads and dietary habits can affect their health; be able to analyze the consequences of consuming a restricted fad diet when given information on its nutrient composition and a table of Recommended Dietary Allowances; and have an awareness of how the senses can affect food choices and how easily their senses can be "fooled."

Two developmental trials of the unit were taught by the author in M.I.T.'s High School Studies Program. Following a teacher workshop, two Boston-area high school science teachers were selected to teach a total of three trials during 1974-75. For each "experimental" class, a "control" class, without instruction, was selected for comparative testing. Pretests and post-tests assessed knowlege levels, concerns about eight different nutrition-related health problems, behavior in situations of choice, and avoidance of eight different food components. All experimental classes showed gains in knowledge significantly larger than those of the controls. The health concerns and behavior sections showed interesting changes in *both* experimental and control classes! Testing results will be reported in the nutrition education literature.

Questionnaires filled out by the experimental class students upon completion of this minicourse showed most thought it interesting, of appropriate difficulty for 11th and 12th grades, and of good to outstanding quality compared to other high school science units.

Antimicrobial Activity

It has been well documented that certain lactic acid bacteria produce antibiotic substances such as nisin, diplococcin, and lactolin. The antimicrobial activity of *Lactobacillus acidophilus* is, for the most part, due to metabolites such as lactic acid, other organic acids, and hydrogen peroxide. It also produces, albeit in minute amounts, antibiotic substances including lactocidin, acidophilin, and the recently isolated acidolin characterized in this article. These antibiotics produced by *L. acidophilus* are reported to be active against gastroenteritis. For studies on therapeutic benefits and on the manufacture of acidophilus milk or yogurt, strains of *L. acidophilus* should be carefully screened for their antimicrobial activity and ability to implant in the intestinal tract.

Mikolajcik, E. M. and Hamdan, I. Y. 1975. Lactobacillus acidophilus. II. Antimicrobial agents. Cult. Dairy Prod. J. 10(1): 18 (Feb.)

Lactase Deficiency and Dairy Foods

Calcium deficiency and possibly osteoporosis may result when milk products are restricted.

To test the tolerance of fermented dairy foods by genetically lactase-deficient patients, three subjects were each fed three diets for four days: 1) Diet A was lactose-free except for the fermented products of yogurt, buttermilk, and cottage cheese; 2) Diet B was lactose-free; 3) Diet C was lactose-free except for non-fermented products of whole milk, powdered skim milk, and ice cream. The calcium, fat, and vitamin D content was identical. Diets A and C supplied approximately 50 grams of lactose per day.

All the subjects tolerated the fermented dairy foods, but consumption of the non-fermented foods caused moderate to severe symptoms of lactose intolerance. Although the reason is unclear, it may be that the bacteria added during the process of culturing dairy foods continue to exert lactase activity in the intestinal tract.

Dietitians are advised to encourage lactase-deficient patients to test their tolerance of fermented dairy foods.

Gallagher, C. R., Molleson, A. L., Caldwell, J. 1975. Lactose intolerance and fermented dairy products. Cult. Dairy Prod. J. 10(1): 22 (Feb.)

Worth Noting

an unusually long life span because of the large quantities of lactobacillus fermented milk that they drank. This sparked much interest in using *Lactobacillus acidophilus* to alter the microflora of the intestinal tract to contain primarily this microorganism. Not all of the reports agreed on the merits of acidophilus milk, but the majority indicated beneficial results when the *L. acidophilus* was fed.[4] This product had a demise, however, owing to difficulties in its manufacture and its unsavory flavor. In more recent years, impetus to the feeding of lactobacilli has resulted from the increased use of antibiotics. Antibiotics alter the intestinal microflora and intestinal discomfort results caused by flatulence and diarrhea. Replenishing the intestinal tract with *L. acidophilus* results in an accelerated return to normalcy in the intestinal microflora and body comfort.

Contrary to the beliefs by earlier workers that beneficial effects from feeding lactobacilli depend on replacing other types of bacteria in the intestinal tract, evidence now indicates that the maintenance of a proper balance among the various normal inhabitants of the intestinal tract is needed.

In Europe various products have been developed which have taken advantage of the increased consumption of yogurt for use as a carrier for *Lactobacillus acidophilus*. The usual cultures involved in yogurt manufacture (*L. bulgaricus* and *S. thermophilus*) are not microorganisms that establish in the intestinal tract. However, efforts have been made to add *Lactobacillus acidophilus* as one of the component strains for yogurt manufacture. This seems to have met with little if any success because the *L. acidophilus* is too easily overgrown by the other two strains. However, different yogurt products have been marketed which are made by adding a preparation of *L. acidophilus*.

The most recent product introduced in the United States is a lowfat milk to which *Lactobacillus acidophilus* has been added. Unpublished results have indicated that this acidophilus product does result in the increased numbers of *L. acidophilus* in feces.

Evidence is increasing that there is a definite place in the American diet for products containing lactobacilli. While a number of foods can be used to carry the *L. acidophilus*, milk has many of the preferred characteristics for such purposes.

There is an interesting and close relationship between microorganisms used in preservative food fermentation and those inhabiting different parts of the human body. Many metabolic interactions of the microorganisms involved in food bioconversions have been clarified; extended and new applications now appear possible for their use in prolonging the safety and shelf-life of modern foods. While basic information on the role of the intestinal microflora still is in its infancy, information is developing rapidly on the metabolic functions of the intestinal microflora and should provide a guide for its more judicious control.

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About the Author

Marvin L. Speck, Ph.D.

The awards of Dr. Speck, William Neal Reynolds Professor of Food Science and Microbiology, North Carolina State University, include the Borden Award in Dairy Manufacturing, The Pfizer-Lewis Award in Cheese Research, and being a World Health Organization Fellow.

He is Chairman of the Inter-Society Committee for the Development of a Compendium of Methods for the Microbiological Examination of Foods, American Public Health Association; a special consultant for the U.S. Public Health Service, and the Pan American Health Organization.

Many of Dr. Neal's 133 publications have been on his research in nutrition and metabolism of starter bacteria, concentrated starter bacteria, intestinal microflora, and bacterial injury by environmental stresses.

The Vitamin Conspiracy. 1975.

By John J. Fried. New York: E. J. Dutton, Saturday Review Press.

Mr. Fried thoroughly reports his review of the literature and his interviews with proponents and opponents of megavitamin therapy in answering the question, "Is vitamin therapy beneficial or harmful and dangerous?"

The author traces the development of megavitamin therapy and gives the reasoning of its proponents, emphasizing the claims and counterclaims about vitamin E for the treatment of heart disease, niacin for the control of schizophrenia, and vitamin C for resistance to colds. He points out that vitamin therapy enthusiasts believe there is no reason why their theories should not work, but that scientifically designed investigations by leading medical researchers have not proved the therories. If vitamin therapy was only ineffective and a waste of money ($700 million annually), he says it would not be disturbing, but there can be dangerous consequences of megavitamin therapy and of self-prescribed daily vitamin supplementation.

The author challenges the scientific nutrition community to communicate more effectively with the public; and he blasts the mass media for helping spread unscientific claims.

The Vitamin Conspiracy suggests that a massive new program to educate physicians and the public is the logical answer to the vitamin dilemma, to assist Americans to be well nourished, and free them from the influence of faddists.

The Vitamin Conspiracy is an impartial book recommended for fascinating, factual reading by professionals and laymen alike.

From National Dairy Council, 6300 River Road, Rosemont, Illinois 60018.

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Nutrition News

FEBRUARY 1976 VOL. 39, N

Nutrition and Dental Health

By Cyril O. Enwonwu, Sc.D., M.D.S.
Professor of Biochemistry
University of Nigeria Medical School

The curricula for most dental schools do not include any identifiable or well-structured courses in nutrition. As a result of this serious omission, a good number of dental clinicians either render uninformed opinion on the practical importance of food nutrients in oral health care, or have silently convinced themselves that good quality nutrition has no place in the prevention, care, and management of dental problems.

The significance of nutrition as an important factor in the maintenance of optimal health is now hardly questioned by well-informed and serious-minded health scientists. Nutritional factors commonly alter the characteristics of many diseases, if they do not indeed determine the presence and onset of the lesions. In support of the latter view is the fact that tissues of the body are dependent on adequate and critical adjustment of the nutritional environment for normal development, structural integrity, metabolism, and function.

Nutritional deficiency states are among the etiologic factors frequently associated with glossitis (inflammation of tongue), cheilosis (fissuring of lips), and stomatitis (inflammation of oral mucosa). Although these non-specific lesions could also be caused by non-nutritional factors, they have served as early indices for predicting the presence of nutritional anemias and some of the avitaminoses.[1] Even dental caries and periodontal disorders are subject to the influence of nutrition. These diseases result from complex interactions between the oral environment, the host/tissue resistance, and the microflora of which dental plaque is composed. All these parameters are affected to varying degrees by the quality, quantity, and physical consistency of foods, as well as by the frequency of food intake.[2,3]

Nutrition and Pre-Eruptive Teeth

While evidence in the human, derived mainly from epidemiologic data, is still incomplete,[4] numerous studies in laboratory animals indicate impaired organic matrix formation and alterations in the structure and eruption timing of teeth. These are a consequence of malnutrition during the complex, multiphasic process of tooth development and maturation. A deficiency of fluorides, calcium, phosphate, calories, proteins, or vitamins A, C, or D is frequently implicated in dental malformations. There is increasing evidence in support of the enhanced susceptibility of such defective teeth to decay-promoting factors.[5,6] Fluoride is the dietary nutrient whose availability during development and maturation of teeth exerts the greatest beneficial effect on the subsequent resistance to dental caries in man.

Influence of Nutrients on Teeth Post-Eruptively

The two major oral diseases, namely dental caries and periodontal disease, show striking geographical and socio-economic patterns of distribution. The former is closely associated with Western civilization, and more specifically with increasing replacement of dietary starch with sugar. The latter is more commonly encountered in malnourished, underprivileged societies.

During the post-eruptive life of the tooth, carbohydrates, specifically disaccharides and monosaccharides, assume the greatest importance among nutrients in relation to dental caries. The frequency of intake, rather than the actual amount ingested, is the more critical factor. The high dental caries activity associated with these carbohydrates is explained by the observations that these nutrients serve as an excellent base for the synthesis of polysaccharides within and outside cells, as well as for the formation of organic acids by microorganisms in dental plaque.

Nutrition and Microbiological Forces In The Oral Cavity

Under normal circumstances, the oral microflora maintain a symbiotic, or at least a harmless, relationship with the human host. In malnutrition, this delicate balance may be upset, enhancing the potency of the microbiological forces. The latter, in part, explains the occurrence of severe ulceration of oral tissues, and even gangrene, found almost exclusively in chronically malnourished population groups.[2,3] In considering the effect of nutrition on oral microbial ecology, it is also pertinent to note that sucrose, considered to be the most cariogenic food substance, also promotes early implantation of dental caries-inducing microorganisms in the mouth.

Nutrition and the Oral Environment

The immediate environment of dental tissues is subject to the influence of secretions from the salivary glands. The chemical composition of saliva is critically dependent upon the rate of flow from the glands. Many studies, both in humans and in laboratory animals, indicate that the physical consistency and nutritional quality of food affect the structure of the major salivary glands as well as the flow rate of saliva. Salivary secretions are good sources of several ions such as calcium, phosphorus, and fluoride. In addition to participating in posteruptive maturation of tooth enamel, these elements also determine the pH at which the tooth mineral content will begin to dissolve. Saliva contains buffers which tend to counteract the fall in pH associated with microbial metabolism of carbohydrates in dental plaque. Saliva also contains immunoglobulin A, which

Continued on Page 4

Nutrition Counseling

Controlling the frequency of consuming particularly cariogenic carbohydrates by substituting a heathful diet is basically all the dietary treatment necessary in the control of dental caries.

Diet therapy in the dental office consists of filling out a dietary record, diet analysis, and appropriate diet counseling. Important points in counseling include keeping it simple and pointing out the necessity of avoiding specific foods entirely for several weeks to change the bacterial balance in the mouth.

A dental program consisting of five visits is described and demonstrates how diet therapy can be integrated with plaque control and fluoride therapy in caries-control.

Alban, A. L. 1975. Dental office nutrition counseling. J Am Soc Prev Dent 5(4):27 (May-June).

Phosphate Enrichment and Dental Caries

A food additive to counteract the cariogenic capability of present-day diets is an attractive concept for the management of dental caries. The present study re-examines the approach of dietary phosphate enrichment and dental caries control in teenagers.

Seventh-grade public-school children of both sexes, aged 13 years, from a fluoridated-water community served as subjects in this three-year permissive dental caries prevention study. The experimental group was provided with phosphate-supplemented ready-to-eat breakfast cereals while the control group received identical but unenriched cereals.

Clinical and radiographic examinations were conducted at intervals of 0, 12, 24, and 36 months. Consumption of phosphate-fortified cereal produced no statistically significant difference in caries experience. Possible factors for the disparity between this observation and the consistent protective effects in animals include phosphate concentration and distribution within diets.

Rowe, N.H., Anderson, R.H., Wanninger, L.A., Jr., Saari, A.L. 1975. Effect of phosphate-enriched ready-to-eat breakfast cereals on dental caries experience in adolescents: a three-year study. J Am Dent Assoc 90(2):412 (Feb.)

Preventive Dental Health Education

By Donna Hoaglin, Dental Health Education Chairman, Women's Auxiliary to the Oregon Dental Association

"OUR MOST COMMON DISEASE ISN'T THE COLD, IT'S TOOTH DECAY! NEARLY EVERYONE HAS IT! With this theme foremost in mind the Oregon Foundation for Dental Research and Development, a nonprofit corporation affiliated with the University of Oregon Dental School, began the development of a Dental Health Teaching Kit. This program was developed in cooperation with the Women's Auxiliary to the Oregon Dental Association and the Women's Auxiliary to the Multnomah County Dental Society.

During the 1970-71 school year, the program was field tested in ten second, sixth, and tenth grade classes.

The Kit is now being used to teach preventive dentistry to children in Oregon schools, grades kindergarten through high school. The program objective is to teach students to control their own dental disease, that is, to keep their mouths healthy. Taught in three 45-minute instruction periods, the program, includes flossing and brushing, use of fluorides, and the effect of diet on dental caries.

Flossing and brushing are practiced during each of the three perids.

Flossing and brushing *only* the upper teeth on the first day allows students to do a thorough job and to compare cleaned upper teeth with uncleaned lower teeth after staining.

Flossing and brushing *only* the lower teeth on the second day allows the same comparison. Also on this day the use of fluorides is discussed.

On the third day, students are shown a systematic sequence of flossing and brushing to assure that no teeth are missed. A sugarless class party held on this day is a highlight for any class level. Invitations can be sent home on the first day inviting parents to attend, share in dental health care information, and enjoy sugarless snacks. Preceding the party a nine-minute *Trigger Foods* film shows which foods trigger dental decay and suggests substitutes. The origin of plaque and its role in causing decay are also illustrated. A trigger food quiz follows. The quiz contains a list of 50 foods. Students pick out the 15 sugar-containing foods to avoid eating between meals.

Eight films are the foundation of the *Preventive Dental Health Education Program.* They provide an easy, rapid means of presenting basic up-to-date dental health concepts with a minimum of teacher time and effort. *Trigger Foods, Brushing and Flossing,* and *The Haunted Mouth* are appropriate for junior and senior high school grades.

The program is flexible enough to be administered at any grade level by the classroom teacher and two trained volunteers. Very little outside preparation is required by the classroom teacher. Materials to be ordered, stored, and distributed are kept to a minimum. Handouts, also kept to a minimum, are coordinated with the subject stressed each day. These "Take-home" handouts are designed to gain parental cooperation and support. The student "Snacks" handout lists snacks in several categories—"juicy, crunchy, thirsty, hungry, and high in iron."

"A suggested list of non-decay snacks to post in your kitchen" is enclosed in the invitation to parents. It includes meat, fruit, vegetable, dairy product and other unsweetened foods and beverages.

A list of follow-up suggestions and a copy of a Dental Health Quiz are left for use at the teacher's discretion. It is suggested that the quiz be given orally as a class discussion, photocopied and sent home with students to administer to their parents, or sent home with students to have parents help in finding the answers.

An evaluation sheet for teacher and students, also left with the class, includes follow-up plans.

The response to the program is very positive and gratifying, especially with upper grade level students who are difficult to impress. Their typical response has been, "Why wasn't I told this before?" Possibly they have been, but not in as meaningful a manner.

Second Graders, Fun-Learning

By Daisy L. Taylor, Second Grade Teacher,
Snow Hill Elementary School, Maryland

"Learning can be fun," presented by 23 second graders, provided our class' Parent Teacher Group an opportunity to become familiar with our nutrition education program, the many ways it is integrated into the total curriculum, and of the importance of good nutrition for everyone.

Parents became involved at home, prior to the meeting, by helping the students do research on foods, customs, education, and climatic conditions that influence the foods available in other lands, and the effects of these on eating habits. Pictures, graphs, charts, and booklets made at home were placed on display around the gym.

The students presented a short skit they had written on good dental health habits. Other ideas developed and displayed were original poems, short stories, illustrations, and booklets pertaining to good dental health habits and nutritious foods.

Some students told about tasting parties, and displayed numerous plants they had grown from seeds. One student explained how an avocado looks, tastes, and how to start a plant with the odd-shaped seed. He displayed charts and graphs of data related to the growth of the plant.

Other pupils explained how cleanliness, safety, refrigeration, etc., are essential in preparing and storing food safely. As an example, they emphasized the processing of milk from farm to family, and told of the many ways milk products may be used to enhance a nutritious diet.

Second-grade-reading books have stories, poems, and recipes related to food, and eating habits common to us and people of other lands. Students applied this knowledge by preparing some of the recipes in the school cafeteria. This gave them a clearer insight into other cultures and how their foods relate to ours. The students made favorite recipe booklets to share with their audience.

One parent shared her experiences in Hawaii, which helped the class identify customs, climate, geography, and typical foods of Hawaii. Student pictures and booklets illustrating Hawaiian food and costumes were also displayed. The children told of their plans and the menu for a luau at a later date.

The highlight of the meeting was a presentation of slides, taken by the students, that depicted how Health Education and Nutrition were integrated into our total curriculum. The slides showed the children having tasting parties; working with food pictures, menus, and recipes; classifying foods into the Four Food Groups; making booklets; and using learning stations. They also showed the children making butter, ice cream, pigs-in-a-blanket, peanut butter balls, and tacos, and cooking rice and eating it with chopsticks. Slides showing the children on trips to the museum, a dairy farm, the fire station, the grocery store, etc. helped to explain and illustrate how resources in the community are used to satisfy basic needs.

Using their own resourcefulness, the students decorated the gym with art displays made from seeds, papier-mache, foods, fruit designs, sand paintings, and fruits and vegetables made from yarn. As a token gift, each parent received a grocery list booklet made in shapes of fruits and vegetables.

The climax of the evening was enjoying the snacks, including cheese balls rolled in nuts, assorted crackers, and a punch made from fresh fruits. Serving trays were decorated with sprigs of parsley, and the table was accented with fresh flowers and papier-mache fruits and vegetables.

With inspiration, imagination, and guidance, second-graders can be introduced to varied, meaningful approaches to learning. The positive results of our program were testimony to the fact that nutrition education can be incorporated into language arts, science, reading, safety, social studies, art, and mathematics as an integral part of instruction.

Plaque Acidity and Snacks

This study reports plaque acidity correlated to several parameters following the consumption of 54 snack foods by 19 young adult subjects.

Considerable differences in plaque activity were noted, making it possible to rank the foods in order of acidogenicity. Some correlations were noted among the parameters measured although no consistent overall relationships could be derived.

Plaque acidity results from the extraneous food acids entering plaques as well as fermentation acids formed in them. Thus, foods that produce great increases in plaque acidity such as cookies, cakes, pies, and candies should be avoided as between-meal snacks. However, more studies need to be undertaken before snack foods which can be consumed with impunity could be named.

Edgar, W. M., Bibby, B. G., Mundorff, S., Rowley, J. 1975. Acid production in plaques after eating snacks: modifying factors in foods. J Am Dent Assoc 90(2):418 (Feb.)

Enamel Demineralization

A clear quantitative relationship between sucrose consumption and dental caries has not been established. A meaningful index of the relative cariogenicity of foods could be obtained by measuring the 1) amount of enamel foods dissolve in vitro when fermented by oral bacteria, and 2) comparative retention of foods in the mouth.

Among the significant findings reported relative to enamel demineralization by and retention of 180 snack foods and beverages are: 1) the amount of enamel destroyed by fermenting foods is not directly proportional to their sugar content or the amount of fermentation acids produced, 2) the lack of relation between bacterial acid production and demineralization by acid candies and other fruit-flavored snack foods, 3) foods with high sugar content seemed to be removed from the mouth more rapidly than those that have starch or other components in them such as breads, cakes, cookies or gum candies, and 4) non-sugar constituents of foods such as sorbitol or flavoring agents can increase or decrease enamel demineralization.

Bibby, B. G., Mundorff, S. A. 1975. Enamel demineralization by snack foods. J Dent Res 54(3):461 (May-June).

is believed to limit bacterial colonization on the epithelial cells of the gums.

Role of Nutrition in Periodontal Disease

The microorganisms of dental plaque and their products are implicated in the origin of inflammatory periodontal disease although the precise mechanism is still not clear.

Virtually all pathological processes in the body involve immune responses. There is increasing evidence from many laboratories that reduced resistance to infection may hold some important clues in clarifying the development of periodontal disease. Impaired ability of body cells to destroy invading microorganisms is frequently noted in prolonged malnutrition. This could in part explain the unusually high prevalence and severity of periodontal lesions found in socioeconomically deprived societies. Other essential features of malnutrition include diminished cellular contents of nucleic acids, reduced rates of protein biosynthesis and cell reproduction, and impaired endocrine balance. Such alterations in normal biological processes do not necessarily initiate, but can certainly serve to modify, the response to local irritative factors commonly associated with the origin of periodontal disease.

Several studies in man and in various experimental animals have demonstrated atrophy of periodontal fibers and osteoporosis of the jaw in prolonged protein-energy deficiency; increased breakdown of periodontal collagen in ascorbic acid deprivation; and resorption of cementum and osteoporosis of the jaw bone resulting from deficiencies of calcium, phosphorus and vitamin D. Increased susceptibility to ulceration and secondary infection occurs in various vitamin deficiency states.

Conclusion

In the present state of scientific knowledge, it is presumptuous to implicate nutritional factors alone in the initiation of dental caries and periodontal disease. Nutrition significantly affects tissue resistance, the complex interaction between the tissues, the oral microbial agents, and the immediate chemical environment of the oral tissues.

It is therefore mandatory that, as the main focus of dentistry shifts from a disease-oriented to a health-oriented discipline, with emphasis on prevention rather than cure, the crucial role of nutrition should not be ignored. Dental schools will be failing woefully if they do not prepare their students with the necessary skill and knowledge to utilize sound nutritional principles in the care and management of their patients.

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[5]*Enwonwu, C.O. 1974. Socioeconomic factors in dental caries prevalence and frequency in Nigerians: An epidemiological study. Caries Res 8: 155-171.*
[6]*Navia, J.M. 1970. Evaluation of nutritional and dietary factors that modify animal caries. J Dent Res 49: 1213-1227.*

About the Author

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Dr. Enwonwu, Professor of Biochemistry, University of Nigeria Medical School, is also Director of Food Investigation Project sponsored by the East Central State of Nigeria, and a member of the Foods and Drug Decree Council of the Republic. Previously, Dr. Enwonwu was Research Professor of Oral Biology at the University of Washington.

Dr. Enwonwu received degrees from the Universities of Ibadan, Nigeria, Bristol, England, and Massachusetts Institute of Technology. He is a member of numerous Nigerian, English, and American scientific societies, and serves on the Committee of Consultants to the Scientific Council of the Federation Dentaire Internationale.

Worth Noting

The Nutrition Crisis, A Reader. 1975. By Theodore P. Labusa, Ph.D. Minneapolis: West Publishing Co.

Crisis, in Chinese, means *danger* and *opportunity*. Danger exists for the malnourished, but many opportunities exist to eliminate the crisis, says Dr. Labusa.

Reliable, diverse, not-too-technical articles from various journals illuminate the *crisis* of widely divided viewpoints on the same nutritional facts. Dr. Labusa selected articles representing opposing viewpoints and drew conclusions which would lead readers to see opportunities to improve their health.

The book progresses from nutritional standards and status in the U.S., to nutrient controversies, unusual diet practices, overweight, and heart disease. It concludes with the food-people-energy-crisis of the world. The epilogue presents brief diet guidelines based on the information presented in the preceding chapters.

Although compiled as a nutrition reader for liberal arts students, **The Nutrition Crisis, A Reader** is recommended for professionals and educated laypeople.

From National Dairy Council

Good nutrition, along with personal and professional care, is an integral part of a new dental health education program developed for use in middle elementary grades. Called **Toothtown U.S.A.,** the program is based on values clarification. It includes a filmstrip with cassette, a cavity-control wall-chart, a take-home poster showing orally safe and cariogenic snacks, and a teacher/leader guide.

Feature: statement of scientific accuracy of the American Dental Association and their award for preventive dentistry. S943N. $15.

How Teeth Grow, revised in 1975, is a stimulant for mothers-to-be to consume a nutritionally adequate diet during pregnancy. Nutrient needs for tooth development are emphasized. Featuring an art nouveau sunrise, "Your Daily Food Guide" and "Your Daily Meal Patterns" merit hanging in the kitchen. Feature: American Dental Association statement of scientific accuracy. B052. 8¢.

Nutrition News

APRIL 1976 VOL. 39, N

Nutrition and Health of the Elderly

By Anthony A. Albanese, Ph.D., Director, Nutrition and Metabolic Research Division, The Burke Rehabilitation Center, White Plains, and Geriatric Nutrition Laboratory, The Miriam Osborn Memorial Home, Rye, New York.

Today the care of the fastest growing minority, the aged, presents the greatest challenge — to create health to correspond with the duration of life. The acceptance of geriatrics as a specialized segment of medicine has focused particular attention on nutrition of the aged.

A common nutritional pitfall of the elderly is the gradual but progressive development of apathy toward other individuals, their environment, and particularly toward food. The aged individual living alone all too often limits nutritional selection to easily prepared foods with a high carbohydrate content such as bread, jam, jelly, and easily prepared cereal foods. Such narrow diet selection does present nutritional difficulties if it persists.

Dietary studies of the Ten State Nutrition Survey and numerous biochemical studies have disclosed that many outwardly normal persons past the age of 50 are definitely deficient in proteins, one or more B vitamins, vitamins A and C, iron and calcium.[1] The adverse effects of environmental malnutrition are frequently aggravated by 1) a decrease in rate of protein synthesis, 2) reduced carbohydrate metabolism resulting in decreased glucose tolerance, and 3) inferior utilization of lipid substances frequently reflected in hyperlipidemia.

In this connection it may be pointed out that faulty nutrition manifests itself in a stepwise order in the following conditions: tissue depletion, biochemical changes, functional changes, and anatomical changes.

We can only review here selected clinical and biochemical observations related to variation in intake of specific nutrients.

Water—Maintenance of fluid balance is essential to distribution of nutriments to the ultimate cellular units, elimination of wastes, and innumerable physiochemical processes. Calculations of average water requirements from our data on persons 65-90 years of age disclosed that normal fluid balance can be maintained with a daily water intake of 1.3 quarts for the average 132 pound individual.

Calories, Carbohydrates, and Fats—One of the important considerations in the nutrition of the aging and aged is the food energy content of the diet. An excess of caloric intake over needs induces overweight—a burden to the cardiovascular system—which accelerates development of degenerative disease and shortens the life span.

Unfortunately, decreased energy expenditure of age is not always followed by decreased calorie intake because food habits tend to remain unchanged. This results in varying degrees of obesity, which is the most prevalent form of malnutrition in this country today.

Much has been written of the causal relationship of increased intake of sugar and fats to the incidence of cardiovascular disease; nonetheless, the subject remains controversial for lack of *hard* experimental data. Our ten-year study with 135 "healthy normal" elderly women showed that when corn or peanut oil margarines were substituted over a five-year period for conventional animal and hydrogenated vegetable shortenings in preparation and serving of all meals, blood cholesterol levels decreased significantly in most women during the first 18 to 24 months but rose to the prior 5-year baseline level within 36 to 48 months.

Proteins—In the elderly, liberal amounts of good quality proteins are especially important to counterbalance the prevailing catabolic processes of age. Dietary animal proteins provide the nitrogen and all the essential and nonessential amino acids needed for the formation of both hard and soft tissues. Vegetable proteins are frequently deficient in one or more essential amino acids. In the presence of adequate amounts of animal-derived proteins, cereal proteins can profitably and economically provide a fair percentage of the total protein of the diet. In our 2-year clinical study, 87 underweight (20%) elderly male and female convalescent patients received a daily dietary supplement containing 560 Calories and 40 grams of milk protein for periods of 3 weeks and showed an average increase in body weight of 4.4 pounds. The control group of 122 equally underweight elderly convalescents gained 2.1 pounds. The hospital diet offered approximately 2000 calories with 65 grams of protein per day.[2]

Iron—The complexities of iron absorption and its metabolic control are not yet fully understood. Because of the high incidence of anemia and difficulties of attaining adequate intakes of iron from ordinary mixed diets, recommendations have been made to fortify staple foods with iron. The elderly living on low-cost diets with little animal protein seem to be particularly vulnerable to development of nutritional anemias. A combination of nutritional anemias may coexist in elderly persons, most often iron-deficiency anemia and deficiencies of either folic acid or vitamin B_{12} or both. Folic acid deficiency may also be found in conjunction with ascorbic acid deficiency, since both of these vitamins are found in fresh fruits and vegetables. Thus, it is important to ascertain the presence of each factor in anemic patients prior to therapy.

Vitamin C—The many functions of vitamin C have not been completely elucidated. Further study is needed, especially in the elderly who bear a lifetime of nutritional shortcomings. Available evidence indicates that vitamin C may be intimately involved in the aging process. While there may be confidence in the amount of vitamin C to prevent overt deficiency symptoms, we are less

Continued on Page 8

Four issues annually: February, April, October, December

Vitamin D Status of the Elderly

Vitamin D status was assessed in four groups totaling 56 female patients over the age of 65. Two groups did not receive vitamin D supplements: Group I (never out of doors), and Group II (sometimes out of doors). Group III received 1000-5000 IU of vitamin D per day, while Group IV received 50,000 IU per day. For comparison, 27 healthy, young adults volunteered blood samples for vitamin D assays (plasma 25(OH)D_3 concentration).

The plasma concentrations in the younger subjects were significantly greater than those in Groups I, II, and III. In Group IV, the plasma concentrations were within or above the upper range found in younger subjects.

Possible contributory mechanisms for vitamin D depletion in the elderly, other than inadequate intake, are discussed.

Corless, D., Beer, M., Bourcher, B. J., Gupta, S. P., Cohen, R. D. 1975. Vitamin D status in long-stay geriatric patients. Lancet 1:1404 (June 28).

Food Habits of the Elderly

Similar average caloric and protein intakes were noted in individuals at least 70 years of age living at home and in nursing homes. Average intakes for all vitamins and minerals except calcium were higher than the 1968 RDA. However, individual intake varied widely. Nutritional scores did not differ significantly because of place of residence, age, or sex, but were lower with decreased mobility.

Nursing home residents more frequently changed food habits. The changes, perhaps due to few food choices, correlated negatively with nutritional scores.

Independent living subjects' food modifications were related to declining health, a less adequate environment, and age, but apparently not by food habit changes.

These data suggest that continuation of the previous diet can maintain good nutrition.

Clarke, M., Wakefield, L. M. 1975. Food choices of institutionalized vs independent-living elderly. J Am Diet Assoc 66:600 (June).

Can Snacks Fulfill RDA?

By Janice Wilson, School Nurse, Urbana, Illinois.

Teenagers do a lot of snacking rather than eating regular meals. This simulation helps them see that if their snacks are chosen wisely, they can provide essential nutrients.

Each student is given a worksheet on which to answer the questions asked in the following story. Numbered questions in the story correspond to numbered blanks on the worksheet.

A Busy Day

Today we are going to have a story about you. Use your imagination. This is going to be a very busy day without time for any proper meals. We want to find out if you can get the required nutrients from a series of snacks.

First, you got up too late for breakfast. The bus was coming so you left for school. 1) As you went out the door you saw a bowl of fruit and grabbed a (banana, orange, apple?) — or did you take the candy bar lying next to the bowl in preference to the fruit?

You got to school 15 minutes early and went to the lounge to meet your friends. The lounge has vending machines with candy, corn chips, potato chips, peanuts, and soft drinks. 2) What did you eat while you were in the lounge?

About 10:30 a.m. you felt cross and tired, and your stomach hurt. Why? It kept on getting worse so you asked your teacher if you could go to the nurse's office. When you told her about your stomachache, she said, "What did you have for breakfast?" 3) She asked if you thought a carton of milk and crackers would help your stomach feel better. What did you tell her? She would bring you a carton of milk and 4 graham crackers if you wanted them. Did you eat them?

After a while you felt better and returned to class. At lunch time you had a dental appointment so you couldn't eat at school. Your mother drove you to the dentist. 4) She brought some things for you to eat—a peanut butter sandwich, a bologna sandwich, a whole raw carrot, celery sticks, a cup of milk in a thermos, a bag of potato chips, an apple, and two fig bars. You had time to eat only three of these items before you arrived at school. What three things did you eat? 5) You could put one or two things in your pocket that you didn't have time to eat in the car, hoping that you would have a break in the afternoon so you would be able to eat them. Did you? If so, what?

In the middle of the afternoon you had a short break; and, if you had a snack in your pocket, you ate it. 6) After school you were hungry and went home for a snack. In the refrigerator were a hard-cooked egg, milk, soft drink, and a piece of pumpkin pie. On the table were candy; a bowl of fruit with oranges, bananas, and apples; raisins; cornflakes; and fig bars. Did you eat anything? If so, what?

Before the family ate supper you had to go to your ball game. 7) After the game (your team won), your team went to your favorite hangout for hamburgers. French fries, milkshakes, and ice cream were also available. What did you have? 8) At bedtime you heard your brother in the kitchen. He was having a ham sandwich and a glass of orange juice. Did you join him? If so, what did you eat?

Given food composition data, e.g. Nutrient Values in Common Foods in Percentage of RDA (Source: Division of Home Economics Education, University of Illinois) and the Recommended Dietary Allowances (RDA) to use with the foods recorded on their Work Sheets, students compare the calories and nutrients in the foods they chose with the RDA. The foods offered in "A Busy Day" could provide 100 percent or more of the calories and all nutrients in the 1968 RDA for teenagers if these choices are made: 1—banana; 2—peanuts; 3—milk, graham crackers; 4—peanut butter sandwich, bologna sandwich, milk; 5—apple, fig bars; 6—egg, pumpkin pie, milk; 7—hamburger; 8—ham sandwich and orange.

This technique, developed in a University of Illinois workshop, was published in detail in *Illinois Teacher*, Vol. XVL, No. 1, p. 29-32.

Nutrition Interest Centers

By Mary Ellen Jones, Team Leader, Barnard School, Rochester, New York

Barnard School primary teachers have an afternoon weekly in which kindergarten-through-third-grade children and teachers work on areas of interest. Last year, teachers inspired by a Big Ideas in Nutrition Education workshop decided that using Interest Centers would be an ideal way to teach a nutrition unit. A Mini-Grant, given by the school district for something over and above the regular curriculum or as a supplement in a curriculum area, was requested, and $100 was received.

Planning for the Interest Centers included all art, music, physical education, K-3 classroom teachers, and the librarian. Eleven areas were set up and lessons planned and scheduled for 12 weeks to enable students to participate in each: 1) Plant Parts We Eat (fruits and vegetables); 2) Dairy Products (making butter and ice cream, value of dairy products to good health); 3) Bread and Cereals (making bread, mathematics to compute cost of making); 4) Meat Products (identification of, origin, and substitutes); 5) Body Awareness; 6) Four Food Groups and Meal Planning; 7) Physical Fitness; 8) Library (books, films, and filmstrips on physical and mental health); 9) Art (making advertisements to promote good food habits); 10) Music (composing songs promoting health); 11) At the Dinner Table (table manners).

In the classes where the food groups were dealt with individually, the students had a chance to study each category in depth. Students tasted kinds of meat, identified the animals meat comes from, delved into economics of shopping, and how mom picks the best meat-group buys each week. In the bread-group lessons, children baked and sampled different kinds of breads. The students studying dairy-group foods made butter and ice cream. Judging from the children's comments and feedback from parents, it was a worthwhile experience for all. The vegetable- and fruit-group studies surprised both students and teachers. They came away with an excellent awareness of the parts of plants and, when they willingly tried them, found out they liked many foods hardly thought of as children's favorites, such as purple cabbage, cauliflower, coconut, and fresh pineapple.

Since a healthy body requires more than just good food, the physical education teacher worked with the students on an awareness of their own body structure, height, and weight; current health practices; and exercises to keep fit. Each child kept an ongoing record, with help of parents, throughout the unit.

The librarian kept an ongoing display of books pertinent to each unit where the children could come and look up things on their own or read for enjoyment, and arranged opportunities for movies and filmstrips to be viewed.

The "At the Dinner Table" lesson, geared toward teaching good manners and ways of making mealtime a relaxing and enjoyable time, was an opportunity to help correct school cafeteria problems.

The art class work was evident as school halls became a myriad of color with paintings, drawings, and posters depicting good foods to eat and reasons why they should be eaten.

A breakfast, held as a culminating activity, was a truly enjoyable experience for the 260 children and their teachers. Good manners were clearly in evidence as well as happy smiles on all the children. Each child ate on a placemat made in art class. Each class sang the song they had composed in music class.

Children's written reactions to the unit were printed in the form of a newspaper and distributed at the breakfast. The students' comments certainly ensured that the project will be continued another year.

Many community resources were happy to contribute to the breakfast, such as a local dairy which donated milk. The butter and muffins came via parents in restaurant or bakery businesses. Having found so many community resources, we will incorporate field trips in each area another time.

Soul Foods for Elderly Americans

Foods with deep significance or emotional meaning are among the many influences on the food and nutrient intake of older people. These foods can be called "soul" foods. "Soul" is not limited to certain foods nor certain ethnic groups. Rather, it is found throughout the world although perhaps not always under that specific name.

Health professionals can help to include soul foods in the diets of elderly persons by: 1) carefully assessing dietary, nutritional, and health status to determine how, when, where, and for and by whom soul foods may be feasibly incorporated into the diet; 2) using innovative teaching approaches; 3) engaging in further research to determine dietary and nutritional interests and needs; 4) recognizing and understanding their food habits and preferences; and 5) treating each case individually despite characteristics ascribed to groups.

Boykin, L. S. 1975. Soul foods for some older Americans. J Am Geriat Soc 23:380 (Aug.).

Community Nutrition Programs

The physiological, social, and economic changes in the lives of older citizens result in living patterns that cause malnutrition, and physical and mental retardation. This article described community nutrition programs for the elderly in a Michigan city including Meals-on-Wheels for the homebound and the Golden Diner's Club for those who need low-cost, nutritionally adequate meals in a social setting.

A survey of participants in these programs and a few nursing home patients (whose meals are provided through institutionalized and public services) revealed that they are satisfied with the meals provided. The findings also support the hypothesis that meals served in a socialized setting provide the elderly not only with the basic nutritional requirements but also actually improve their interest in good food.

Rankine, D. C., and B. Taylor. 1975. Are community nutrition programs meeting the needs of the elderly? J. Home Econ 67:37 (Nov).

sure about the nutritionally optimal amounts needed for other purposes, including slowing down the process of cell aging. Biochemical data suggest that vitamin C may exert a protective role because of its ability to synergize the antiperoxidative activity of vitamin E.

Calcium—Because of the many metabolic and nutritional functions of calcium and their relation to the high incidence of osteoporosis in the elderly, further investigation of the needs of this nutrient is indicated. Osteoporosis constitutes a major orthopedic disorder in about 25 percent of post-menopausal women.

There is strong evidence that long-continued, inadequate intake of calcium may lead to osteoporosis. Some osteoporotics show increased bone regeneration and a high retention of calcium when placed on high-calcium diets. Intestinal malabsorption syndromes, which frequently occur in the aged, reduce calcium bioavailability in the face of an adequate intake. This problem may be overcome in most instances by raising calcium intake, so that the amount absorbed is increased proportionately. It is the change of balance of various hormone systems associated with the onset of menopause which causes a major and progressive loss of bone in women of 45+ years. Calcium retention is adversely affected by emotions, inactivity or immobility which increase with age.

Vitamin D increases calcium absorption, particularly under conditons of low intestinal tract concentrations. Adequate intake of vitamin C appears to be essential for biosynthesis of collagen—bone protein.

A USDA survey of 5500 "normal" females showed that the estimated calcium consumption averaged approximately 450 milligrams per day in the age group of 45+ years. In our studies we observed a high incidence of subnormal coefficients of bone density and spontaneous fractures for 313 females over 55 years of age.[3] In another study with "healthy normal" elderly females, average age age 80.2 years, whose calcium intake from self-selected regimens was 450 ± 50 milligrams per day, we found x rays showed that bone loss reversal was evident following calcium supplementation of 700-800 milligrams per day for periods of 12-36 months. Coincidentally, a decrease in serum cholesterol levels occurred with improved bone density.

Over the 25 years of our studies in geriatric nutrition, we have found that elderly individuals frequently raise the especially pertinent question: "At my age, what benefits are yet available from adequate nutrition?" In answering, it must be frankly recognized that either the benefits or the blights of past nutrition are already recorded. Although in the advanced years many of the scars of past malnutrition cannot be eradicated, others may be improved in greater or lesser degree. Effort, therefore, should be directed toward detection of nutritional failure in the elderly patient and toward the application of proper nutritional therapy. Even in the last period of life, good nutrition offers its rewards. Further advance of the aging processes and of chronic degenerative disease may thus be retarded. Existing degrees of health and vigor thereby are sustained and, in many instances, may be improved. Also good nutrition appears to work on the favorable side of longevity, even though but a few years remain.

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2. *Higgons, R.H. and Albanese, A.A. 1957. Management of malnutrition of convalescence. N Y State J Med 57: 2951.*
3. *Albanese, A.A., Edelson, A.H., Lorenze, E. J., III, Woodhull, M. L. and Wein, E. H. 1975. Problems of bone health in elderly: ten-year study. N Y State J Med 75:326*

About the Author

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Dr. Albanese has published over 240 articles in the field of human nutritional research and methods; is a research consultant to several governmental agencies, and to many pharmaceutical and chemical organizations; and is a member of the President's Science Advisory Committee on Toxicology Information Program.

Worth Noting

Nutrition Labeling how it can work for you. 1975. The National Nutrition Consortium, Inc. with Ronald M. Deutsch. Nutrition Labeling, P.O. Box 4110, Kankakee, IL 60901. $2.

The National Nutrition Consortium, Inc., brought together nutrition experts and writer R. M. Deutsch to produce 1) a basic text on nutrition, and 2) how information on labels can be used in nutrition education and meal planning.

The meaning of the U.S. RDA, label terminology in formulated foods, the role of additives, and still-unresolved problems related to food processing and marketing are also discussed.

Although the Consortium developed this book for a consistent presentation of information on nutrition labeling by media communicators, it is recommended for students and the general public.

Alphabet Soup. 1975. Selph, A. D., Street, B. G. Selph-Street Enterprises, 2502 Winton Road, Durham, NC 27707. $5.50.

An imaginative, fresh approach to teaching nutrition with vocabulary and spelling, geography and culture, science and botany, art, health and in school lunch program. Includes: basic nutrition facts; poems about foods from A to Z which identify physical characteristics, food value, and the food group to which each belongs; and recipes.

From National Dairy Council

Food: A Super Natural Resource is a multimedia, multidisciplinary, secondary school program to help students identify their values about personal eating habits, food purchasing, and nutrition. It provides them with the information needed to make intelligent consumer choices.

Students report that the program presents concepts vital to today's consumers. Further, validation data shows student increase in consumer knowledge to be statistically significant.

The complete teaching program contains a 15-minute, color, filmstrip and a cassette; 6 color transparencies; a 31-page volume of spirit masters; a teacher's Guide; a wall poster; and take-home leaflets. No. B345. $22.

Nutrition News

OCTOBER 1976 VOL. 39

Alcohol and Nutrition

By Charles S. Lieber, M.D., Chief, Section and Laboratory of Liver Disease, Nutrition and Alcoholism, Bronx Veterans Administration Hospital, and Professor of Medicine and Pathology, Mt. Sinai School of Medicine of the City University of New York, Bronx, New York

Thirty years ago, researchers considered the possibility that malnutrition promotes alcoholism. More recently, this theory has been abandoned.

Malnutrition, as well as impaired digestion and absorption, is now considered a result of chronic alcohol consumption. Independent of nutritional factors, alcohol also directly affects the development of fatty liver, hepatitis, and cirrhosis.

Malnutrition

Malnutrition is common among alcoholics because alcohol, high in caloric value, displaces other foods in the diet. Each gram of ethanol provides 7.1 Calories. Twenty ounces of an 86-proof beverage contain about 1500 Calories or approximately one-half to two-thirds of the recommended daily dietary allowance (RDA) for calories.

However, the calories provided by alcohol do not fully "count," at least at relatively high levels of intake, especially among alcoholics.[1] One of the pathways of ethanol metabolism is wasteful. Ethanol does not effectively form high energy phosphate bonds, therefore heat is produced without conservation of chemical energy.

Although the alcoholic has a reduced demand for food to fulfill his caloric needs, alcoholic beverages contain few, if any, vitamins, minerals, protein, or other nutrients. The alcoholic's intake of foods containing these nutrients may readily become insufficient. Economic factors may also reduce consumption of nutrient-rich food.

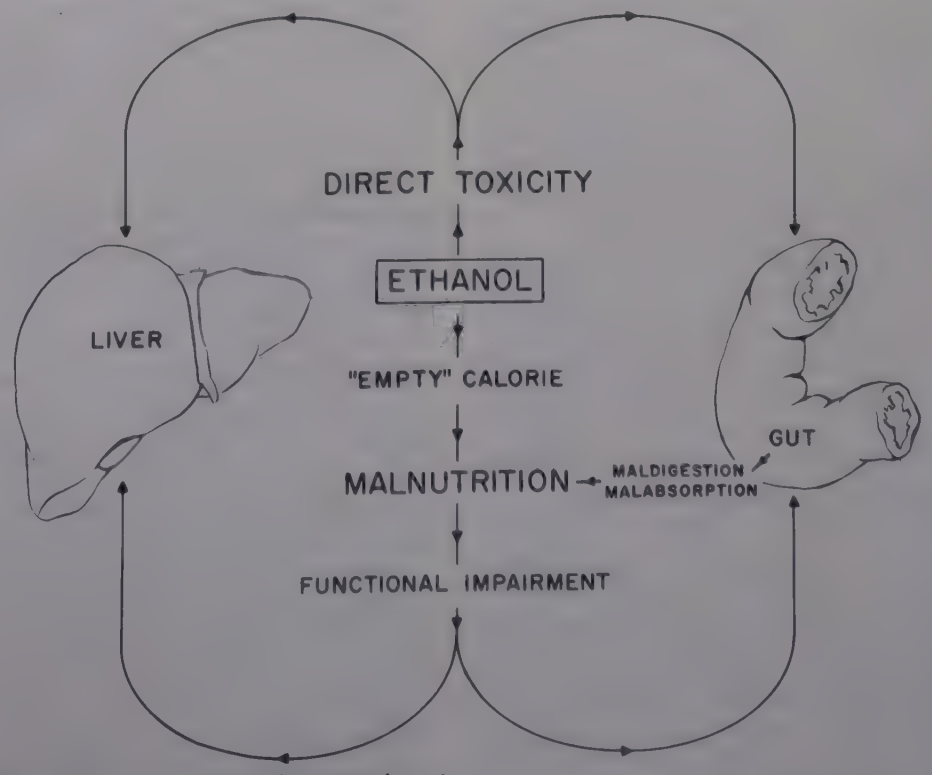
Chronic alcohol consumption can also result in malnutrition by interfering with normal food digestion and absorption. Alcohol exerts a direct effect on the gut[2] and pancreas. At high concentrations, it causes erosions of the gastrointestinal mucosa. Even in the absence of these lesions, alcohol abuse reduces intestinal enzymes.

Alcohol may also impair absorption of a number of essential nutrients, including vitamins B_1 and B_{12}.[3] Combining malnutrition with alcoholism is obviously "adding insult to injury."

For all these reasons, deficiency diseases develop more readily in the alcoholic than in the non-alcoholic population. Pellagra, once common in the alcoholic, has now practically disappeared. Similarly, overt thiamin deficiency such as Wernicke's syndrome is uncommon. However, mild thiamin deficiency, as well as riboflavin and pyridoxine deficiencies, can be observed. One of the most common alcoholic vitamin deficiencies is of folate,[4] a major cause of macrocytic anemia.

Mineral deficiencies have also been reported in the alcoholic. Low serum magnesium has been described. Similarly, zinc deficiency occurs in alcoholics due, in part, to increased zinc excretion. While mineral deficiencies are relatively uncommon and rarely warrant specific preventive action, vitamin deficiencies are sufficiently prevalent to merit vitamin therapy in known alcoholics.

A number of alcoholics also have a history of poor protein intake which may result in protein depletion. However, it is somewhat difficult to differentiate protein deficiency from decreased protein production as a result of liver disease. Protein repletion must, therefore, be carried out



Interaction of alcohol on liver and gut.

Illustration reprinted courtesy of the Amercan Medical Association, copyright 1975. JAMA 233(10):1078 (Sept. 8, 1975).

Continued on Page 12

Alcohol and Cancer Risk

Heavy drinking may increase susceptibility to cancer formation because 1) alcohol, itself, may be carcinogenic; 2) alcoholic beverages may be contaminated with carcinogenic compounds during or after production; 3) alcohol may damage mucosal membranes, increasing susceptibility to another carcinogen; 4) alcohol may enhance the carcinogenic effect of smoking; and 5) alcoholism may cause nutritional defects which, in turn, predispose to cancer.

Clinical incidences of cancer production seem strongest when alcohol is in direct contact with tissues, as in the oropharynx, larynx, and esophagus, or where there is serious organ damage, as in the liver. While alcoholism may possibly be implicated in the formation of pancreatic and prostatic cancer, it does not seem to have an influence on cancer of the breast, lung, colon, or cervix.

Decreased exposure to alcohol may be one method to achieve a significant decrease in cancer morbidity and mortality.

Lowenfels, A.B. 1975. Alcoholism and the risk of cancer. Ann NY Acad Sci 252:366 (April 25).

Dieting, Alcohol, and Coordination

When glycogen reserves are depleted, glucose, required for the brain and central nervous system, is normally produced by gluconeogenesis. Alcohol slows down formation of glucose from fat and protein, which explains the common occurrence of severe hypoglycemia among undernourished alcoholics. Hypoglycemia is defined as blood sugar levels below 50 mg per 100 ml.

An experiment was designed to evaluate the combined effect of alcohol and the popular low-carbohydrate diet (which depletes liver glycogen) on perceptual motor skill or coordination. Three of the eleven subjects tested became hypoglycemic. Two of the three exhibited decreased perceptual motor skill as measured by the Stressalyzer machine, a step-input pursuit tracking machine. The authors conjectured that more subjects would have become hypoglycemic had the six-day test period been extended a day or two longer.

McLaughlan, J.M., Usher, D., Noel, F.J., and Moodie, C.A. 1976. Effect of a low-carbohydrate diet and alcohol on perceptual motor skill. J Am Diet Assoc 68:138 (Feb.).

Teens Effectively Teach Pre-Teens

By Esther W. Shoup, Extension Home Economist
Tolland County, Vernon, Connecticut

The old idea of "learning by teaching" was tested recently in a Somers, CT nutrition class project.

Eighteen eighth grade girls volunteered to teach four lessons in nutrition to 242 fourth and fifth grade students in a nearby elementary school.

Because neither school offered a type "A" lunch, teachers were anxious for the project to have an impact. Both cafeterias serve a variety of food, including some "junk" items.

To aid the children in making cafeteria selections, the teen teams taught lessons on "The Breakfast Game," "Choosing Snacks," or "Pick a Lunch." Classroom teachers, children, and teenagers all helped to choose the units to be taught.

To help the teens plan their own lessons, a guide on concepts, behavioral objectives, and related activities for each subject area was prepared. For their four 30-minute lessons, each team determined its own set of objectives and chose related activities.

These activities included choosing snacks from certain food groups and picking a balanced lunch from the foods available in the school cafeteria. Some teams designed nutrition bingo games and a variety of crossword-type puzzles.

Each group also served less traditional, easy-to-prepare foods to show children how to use foods in meals or for snacks. With much of the food preparation done by the teens prior to class time, the children were able to make or complete most of the foods served. Taste samples included milk drinks served in paper cups and saucer-size pizzas cut in quarters.

Money for this food came from the high school home economics food budget and the teens themselves. Small electrical appliances were borrowed from the home economics department.

Observing these teaching experiences, elementary and junior high teachers looked for answers to three questions:

1) Can teens be effective teachers of nutrition to elementary students? Evaluating each lesson taught by the eighth graders, the elementary teachers determined that teens can be effective teachers if they are prepared and arrive promptly. The lessons were rated "Great," "Good as can be expected," "So-So," or "Real Bummer."

Two things would help improve the quality of this project. Although lesson plans were reviewed by the teams and junior high teacher, the teens should do a "dry run" before at least the first lesson. Second, a special system needs to be devised to cover the class if a teen is absent from school.

2) Will teens change their negative feelings about foods as a result of helping others learn about food values? Each teen's feelings about a variety of foods were recorded at the beginning of the project. After their teaching experiences, the eighth graders developed a more positive attitude toward cheese, yogurt, custard, and grinders (submarine sandwiches). A more skeptical attitude about powdered fruit drinks and soda was also formed.

3) How much information can teens learn from such teaching assignments? Teen training included a pre-test and a post-test on nutrition information. The test results showed that while only one-third of the girls scored over 80 percent on the pre-test, three-fourths scored over 80 percent on the post-test.

The observing teachers felt the teen teams were an effective method of teaching. The eighth grade girls were "turned on" to school and nutrition. They were impressed that they could *teach*, not just run errands.

In addition, the fourth and fifth graders were exposed to nutrition information. Elementary teachers who had limited training in this subject also became more informed.

Although the eighth graders had to be excused from regularly scheduled classes, their teachers felt the team teaching was a "superior experience."

Perhaps the most important accomplishment of this nutrition class project was that the teens had to learn themselves in order to help others learn.

Gardening Stimulates Nutrition Lessons

By Selma Held, Chairman, Home Economics Department,
Island Trees High School, Levittown, New York

There will always be a place for teaching nutrition in the traditional way. But there is another method to teach the nutrients and their functions.

I felt that a class gardening project would be an informal yet stimulating way to teach nutrition, since working in my own garden gave me so much personal enjoyment. Rather than giving a formal lecture, I could casually cover nutrition facts and fallacies while the students planted, weeded, harvested, and finally prepared recipes with their garden yield. The harvest could also supplement our limited classroom food budget.

After attending classes given by the county extension service and reading books from the local library, I approached my home economics foods classes with the idea.

Initially, we chose to grow vegetables that could be used in our fall food preparation classes. A hearty vegetable soup is one of our first cooking projects because it involves the use of small knives and vegetable peelers.

The seeds and seedlings were selected on the basis of climatic and soil conditions for our area, taking into consideration the length of growing time needed to teach maturity. Our garden, a 15' x 15' plot on the school grounds, had to have a good growing start before the end of the spring term.

After reading seed catalogs, we chose to grow green peppers, eggplant, tomatoes, green beans, onions, and zucchini. We also selected some herbs—basil, savory, parsley, and chives. We avoided some vegetables, such as lettuce or radishes, because they mature rather quickly or could not be stored for any length of time.

Each student was responsible for researching the nutritional value of the vegetable he or she planted.

Because the height of the growing season occurs when classes are not in session, a schedule had to be made for volunteers to weed, water, harvest, and store the produce. When mature, green beans and peppers were frozen. Herbs were either dried or put into a blender with a small amount of water and then frozen in ice cube trays. Fortunately, most of the ripening took place two weeks before the opening of school.

When the fall term began, all of the home economics students (including those who were not involved in the planting) peeled, sliced, diced, and cooked the "school-grown" produce. In addition to vegetable soups, they made tomato sauces using the green peppers, onions, tomatoes, and basil. These sauces were frozen and used later on spaghetti and in lasagna.

We also made a relish from green tomatoes. The relish was served with hamburgers at a luncheon for the science students who loaned us the garden plot. We used the herbs in aromatic butters which were spread on our own whole wheat breads.

During this whole process, I always managed to impart some nutrition information—green peppers and tomatoes are a good source of vitamins A and C, green beans contribute to our mineral intake of phosphorus and potassium.

Students also learned that vegetables and herbs can make tasty, nutritious, yet low-cost dishes. They recognized the taste difference between their own produce cooked to preserve nutrients and those grocery products which have been shipped.

Students agreed that nutrition is more fun when related to their favorite foods. Yet, they were more willing to expand their food experiences when they grew the foods themselves.

The concepts of meal planning with the Recommended Daily Allowances and eating a variety of foods became clearer when we served our own vegetable soup, lasagna, whole wheat bread, and apple crisp with milk. There were no complaints of "being on a diet," no appetite, or not liking a certain dish.

Home-produced, home-prepared foods convinced many that the effort had been worthwhile.

Glances

Maternal Alcoholism and Infants

Chronic maternal alcoholism is recognized as one of the most common causes of fetal mental deficiency. Recently, a pattern of malformation in infants born to women with severe chronic alcoholism has been identified and termed "fetal alcohol syndrome."

This paper summarizes common abnormalities observed in 41 of these children which could aid in diagnosis of the syndrome. Defects include prenatal and postnatal growth deficiency, small head size with mental subnormality, and facial and skeletal anomalies.

The exact cause of this syndrome has not been determined. However, there is limited evidence that ethanol or some toxic breakdown product from alcohol is the most likely causative agent.

The prevalence of severe chronic alcoholism during pregnancy has been conservatively estimated at 4 to 12 percent. Because it is difficult to correct effects of chronic maternal alcoholism on prenatal development, it is critical that pregnant alcoholics recognize their problem early and take preventive measures.

Hanson, J.W., Jones, K.L., and Smith, D.W. 1976. Fetal alcohol syndrome. Experience with 41 patients. JAMA 234:1458 (April 5).

Alcoholism—an Illness

Alcoholism has been defined as an illness characterized by preoccupation with alcohol and loss of control over its consumption.

Although there is no accurate count of alcoholics in the U.S., figures point to alcohol as a factor in about one-half of the car accidents fatal to drivers and one-third of those fatal to pedestrians. Life expectancy of the alcoholic also seems to be shorter.

Alcohol's effects on the body are described in this 13-page booklet, along with physiological, psychological, and sociological causes of alcoholism.

Successful treatment of this illness should extend beyond the immediate attention received in hospitals and doctors' offices. Local, state, and national organizations and agencies, as well as industrial programs, should provide follow-up care to rehabilitate the alcoholic.

American Medical Association, Committee on Alcoholism and Drug Dependency. Council on Mental Health. 1973. The illness called alcoholism. Chicago: American Medical Association.

cautiously in the alcoholic since protein overload in those with severe liver disease may be harmful.

Liver Disorders

While most vitamin deficiencies are now recognized as deficiencies due to inadequate intake rather than due to a direct toxic effect of alcohol, the reverse is true with liver disease. Traditionally, disorders affecting the liver were attributed exclusively to nutritional deficiencies accompanying alcoholism. Recent studies, however, show that alcohol itself is a direct cause of alcoholic liver disease. Experimental evidence and statistics gathered in France and Germany indicate that incidence of liver disease is correlated with amount of alcohol consumed rather than with deficiencies in the diet.

To determine if chronic alcohol ingestion leads to deposition of dietary fat in the liver, rats were fed large amounts of ethanol as part of a liquid diet.[5] Despite nutritionally adequate diets, the rats developed fatty liver. In addition, the rats displayed an ethanol dependence and had typical withdrawal seizures when their alcohol intake was terminated.

Human volunteers[6] were also tested to determine if alcohol ingestion in amounts comparable to those consumed by chronic alcoholics is capable of injuring the liver. Test subjects were fed a variety of normal[5] or high protein[7] diets under controlled conditions. Ethanol either supplemented the diet or replaced carbohydrate calories. All human subjects also developed fatty liver.

Fatty liver develops when alcohol replaces fat as the preferred energy source for the liver. Combustion of fat ceases and lipid accumulates in the liver.

Although alcoholics may display varying degrees of liver complication ranging from reversible fatty liver to alcoholic hepatitis and finally irreversible cirrhosis, the relationship between these disorders has been the subject of much debate.

To test the progression of liver disorders, 16 baboons were fed a nutritionally adequate diet. However, 50 percent of their total calories consisted of ethanol. Their intake of alcohol was sufficient to result in periods of obvious inebriation. These animals all developed excessive fat accumulation in the liver. In addition, five showed alcoholic hepatitis and five others studied for two to four years developed cirrhosis of the liver.[7] The study demonstrated that fatty liver, alcoholic hepatitis, and cirrhosis can all be produced by prolonged alcohol ingestion, even with nutritionally adequate diets.

This is not to downgrade the importance of good nutrition in the alcoholic. Adequate nutrition is essential for the normal functioning of all organs, including the liver. In fact, the treatment of alcoholics includes restoration of vitamin, mineral, and protein levels reduced because of low intake, poor digestion, or malabsorption.

However, the alcoholic should not be led to believe that mere correction or prevention of nutritional inadequacies will fully protect against liver damage. To this end, control of alcohol intake is also needed.

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About the Author

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Dr. Lieber is Professor of Medicine and Pathology at the Mt. Sinai School of Medicine of the City University of New York. He is also Chief of the Liver Disease and Nutrition Section and Director of the Alcoholism Research Laboratory at Bronx Veterans Administration Hospital.

Dr. Lieber is the author or coauthor of three hundred scientific publications. In recent years, he has served as President of the New York Gastroenterological Association, the American Medical Society on Alcoholism, and the American Society for Clinical Nutrition. He has been on editorial boards of a number of journals including the Journal of Nutrition and Gastroenterology.

Worth Noting

The Guide to Fiber in Foods. 1976. By Barbara Kraus. Bergenfield, N.J.: New American Library, Inc.

This book contains a good compilation of the *crude* fiber and caloric content of foods from abalone through zweiback in common household measures. *Dietary* fiber must be inferred from crude fiber content.

Nutrition for Today. 1976. By Thora J. Runyan. New York: Harper & Row Publishers.

This book is written for those who choose to learn by themselves, as well as for nutrition students who want to reach their own decisions on the basis of facts. Interesting, well-organized, factual presentation of nutrition as a social science, as well as a natural science. Hunger, malnutrition, and the world food situation are discussed.

Fat Content and Composition of Animal Products. 1976. Washington, D.C.: National Academy of Sciences.

Proceedings of the 1974 symposium sponsored by the Food and Nutrition Board and the Board of Agriculture and Renewable Resources. This symposium culminated a two-year effort to assess the need for change in fat quantity and composition of meat, dairy products, and eggs; production and marketing; and certain aspects of human nutrition and dietary habits.

The Health Robbers. 1976. Edited by Stephen Barret, M.D., and Gilda Knight. Philadelphia: George F. Stickley Co., Publishers.

This special book-length publication of the Lehigh Valley Committee Against Health Fraud, Inc., is a fascinating, enlightening, factual expose of deceptive health practices and exploitative "health robbers." Written for public education by 23 qualified authors, **The Health Robbers** describes how to spot quackery to avoid being robbed of cash and health, how and where to get valid answers to health questions, and how to press for stronger consumer protection and health education.

Nutrition News

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Weight Control through Imagery Training

By Frances Stern, Ph.D., Associate Professor of Psychology, Kean College of New Jersey, and Director, Institute for Behavioral Awareness, Springfield, New Jersey.

Despite considerable effort on the part of nutritionists, physicians, and psychologists, the classical approaches to weight control (which rely heavily on restrictive dieting, increased acitvity levels, and psychodynamic "insights") have not yielded significantly successful weight losses.

A new approach to weight control used by the Institute for Behavioral Awareness (IBA) in Springfield, New Jersey, has yielded more promising results.

Although no specific diet was prescribed, 69 men and women using IBA techniques lost an average of 16 pounds in 14 weeks. Twenty-one subjects lost more than 20 pounds, seven lost over 30 pounds, and one lost over 40 pounds.

A one-year follow-up study indicated that 70 percent of these people still weighed within five pounds of the weight recorded upon program completion. Subjects reported that they continue to use IBA techniques and have generalized the methods to other areas of their lives.

The Institute's 16-week weight control program concentrates on both the observable (overt) and inner (covert) aspects of the eating situation. The concepts and techniques used have just recently been applied to weight control.

Clients are taught to pinpoint, record, and determine consequences of overeating. They also learn to reinterpret their own self/body image and cope with situations through appropriate assertiveness, restructuring of internal thoughts, and self-instruction.

The Institute's program utilizes small group settings, extensive record keeping, modeling, behavioral rehearsals, and relaxation techniques to develop these skills. Unique are the imagery training tools (mind trips or positive daydreams) in which clients learn to handle "private," internal behavior.

These mind trips (called meta-images), unlike other inner behavior, are thoughts and images in which the individual actually does something about his environment. The mind, a rich store-house of experiences, can be guided and structured to produce these positive daydreams. Dr. Jerome L. Singer of Harvard asserts that fantasies and daydreams are purposeful and play a significant role in healthy development.[1]

Although an instructor is necessary to direct students through the first few images, these learned responses can later be voluntarily replicated. Clients eventually depend more upon themselves to alter behavior and provide reinforcement.

Shaping Mind Trips

Imaginal skills can best be acquired when taught concretely. First, before engaging in imagery, it may be beneficial for students to take a few deep breaths or relax in some other manner. Relaxing may reduce tension and responsiveness to external stimuli. Second, clients should engage as many of their senses in the "mind scenes" as possible.

To shape imaginal skills, IBA begins by having clients describe an imaginary rock that is "resting" in their laps. After a verbal description, they then "touch" the rock, "feel" its heaviness, and subsequently "place" it somewhere. At this point, most people are able to close their eyes and describe the scene in which they have placed their rock. Surprisingly, many people have developed extensive scenes at this early stage.

Imaginal skills can also be developed by having clients listen to a sound-effects tape and describe what they "observe." Or, after watching a favorite television program, clients can be asked to turn off the set and "rerun" the program on the empty screen.

Daydreams as Therapeutic Tools

Although this type of inner experience has been used for decades in Asia and Europe, it is a relatively new concept in America. We are just now studying imagery and applying the techniques to shape a wide range of behavior—from playing better tennis to eliminating phobias.

Work on imagery began with behaviorists and psychotherapists working with neurotic patients. However, most current psychological approaches rely, to some extent, on imaginal procedures with all kinds of clients.

The Institute uses structured images (pre-planned mind trips) to accelerate learning.[2] They appear to be quite effective in instilling new eating patterns and have the added attraction of novelty. This is important in delivering health services to overweight clients disillusioned and jaded after trying "every" approach to weight loss, often to little avail.

These meticulously constructed images have added advantages for the nutritionist, health professional, or teacher involved in weight control programs—the technique is simple to learn and requires no special educational level. Easy to perform, these images require only 10 minutes of daily practice and can be done anywhere. Meta-imagery allows overweights to interject themselves into the imaginal scene, depicting their own unique eating problems and the potential for solving them.

Uses of Imagery

With practice, imagery heightens the client's ability to produce and experience vivid images. Eventually they are able to intervene mentally and change their own overt behavior. The following types of pre-planned daydreams are used to handle daily situations.

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Exercise and Weight Reduction

The effects of a weight reduction-physical activity program on sedentary middle-aged women is described relative to degenerative disease-related variables. These variables include body composition, blood pressure, physical working capacity, and blood lipids.

Results of this program revealed highly significant reductions in mean total body weight, fat body weight, and percent fat. The high density lipoprotein (HDL) cholesterol to low density lipoprotein (LDL) cholesterol ratio increased significantly. This is noteworthy in light of recent findings suggesting that the level of HDL cholesterol may be inversely related to the risk of coronary heart disease.

The data gathered from this study indicated that positively reinforced increases in regular exercise can, in conjunction with moderate caloric restriction, promote weight loss, alteration of body composition, and increased tolerance to physical exertion in overweight middle-aged women.

Lewis, S., Haskell, W.L., Wood, P.D., Manoogian, N., Bailey, J.E., Pereira, M. 1976. Effects of physical activity on weight reduction in obese middle-aged women. Am J Clin Nutr 29(2): 151 (Feb.).

Two Approaches to Weight Control

Two widely discrepant approaches to weight control were tested to determine which people would be most amenable to each treatment technique.

The eating behaviors of 19 obese subjects were designated as either "good" (having food habits similar to nonobese people) or "bad" (displaying potential excessive eating habits).

Half of the "good" and half of the "bad" eaters were placed in a psychotherapy group which tried to get at the cause of their overeating. The other half of each group attended behavioral training sessions in which their eating habits were monitored.

This investigation found the "bad" eaters benefitted more from the behavioral group and the "good" eaters benefitted more from psychotherapy, suggesting different types of obesity and the need for corresponding treatment approaches.

Schumaker, J.F., Wagner, M.K., Grodnitzky, B.H., Lockwood, G.E. 1976. Eating behaviors and the effectiveness of behavioral training and psychotherapy approaches to weight reduction. Obesity/Bariatric Med 5(4):136 (July-Aug.).

National Nutrition Week—Spanish Style

By Barbara B. Shaul, Head, Department of Home Economics, Bishop Grimes High School, East Syracuse, New York

Nutrition became the focus for education, cooperation, innovation, and personal evaluation during Bishop Grimes High School's National Nutrition Week program last March.

One of the program's major objectives was to extend nutrition education beyond home economics and health classrooms, making everyone aware of the importance of good nutrition to personal well-being. To demonstrate nutrition's relevance to everyone's living pattern, we focused on "Spanish Culture and Food." This theme served to involve not only students and faculty, but also parents and members of the community, in sharing ideas, demonstrating various aspects of nutrition, and trying new foods.

Demonstrations and discussions in the home economics room were learning as well as tasting experiences in the basic four food groups—Spanish style. Milk and milk products, meat and meat substitutes, fruits and vegetables, and breads and cereals are available to Spaniards, just as they are to Americans. However, program participants discovered a few new food group members and variations in their discussion of Spanish foods.

For instance, milk, an important part of every American's diet at all age levels, is often replaced by cheese after age nine in Spain. Delicately flavored cheese made from sheep or goat's milk is often served in wedges with the meal or for dessert.

Students attending discussions also learned fish takes an important place in the Spanish meat group. Living on a peninsula, Spaniards eat a variety of fish including shellfish, bream, tuna, shrimp, and lobster. Cod, which has replaced the whale as the major fishing industry, is served in many different ways, including dried. Veal, lamb, pork chops, poultry, and sausage are also eaten.

Actual foods grown in Spain were served during the Spanish culture and food sessions as teachers discussed their nutritional value. An avocado, representing the fruit and vegetable group, was served raw while guava jelly was used as an hors d'oeuvre. Students also discovered the delicious liquid salad/soup, gazpacho, made from crisp, fresh vegetables from local gardens.

Spanish rice, lacking the onions, tomatoes, and ground beef Americans associate with the dish, is a commonly eaten grain product. A real national dish, Spanish rice is a yellow or saffron rice with a touch of garlic.

Although Spanish cooking is characterized by subtle flavors with garlic seasonings, students could still recognize the basic four food groups. But in Spain, as in the U.S., it is the individual's choice to be well-nourished by his own careful selection of foods.

This same concept was also conveyed in the "Basic Nutrition" session, the Low-Calorie Snack Food contest, and even exercise classes held during Nutrition Week.

This program was directed by, to, for, and with the high school students. Students, with the help of a steering committee including the home economics teacher, the school nurse, the health education teacher, and a diet therapist, began planning the event long before Christmas.

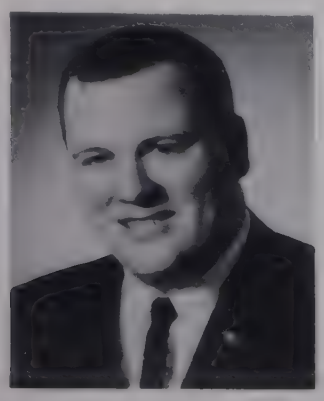
Films were ordered, speakers were obtained, and other departments within the school coordinated their programs with the international nutrition week. Posters, school announcements, newspaper publicity, and photographs helped bring attendance at the programs to an all-time high. Adults (parents and other members of the community) were also invited to attend any of the functions which interested them.

After the program, students frequently said, "That was great this year, I hope we do it again." Students even offered to do demonstrations next year. Faculty and parents also expressed pleasure with the results. The school's principal felt the week had been very worthwhile and hoped it would be repeated next year in a similar manner.

The attitude of everyone involved in the Nutrition Week program was unanimous, "Let's do it again!"

Increasing School Lunch Participation

By Gary Krimmel, Director of Food Services,
Minneapolis Public Schools, Minneapolis, Minnesota



Lunch time at North High, an open-campus city high school, meant mass exodus to local commercial food service outlets. Not only was the low participation in the high school food service program hurting the school, but undesirable incidents were occurring in the neighborhood during lunch periods. Some students returned late to class. Others did not come back at all.

Most school administrators agreed that this problem could be corrected if more students participated in the school lunch program. When a new high school was being planned to replace the old building just three blocks away, the go-ahead to develop a new food service program was authorized.

To combat the problem, food service staff felt the menu would have to be revised to overcome the commercial competition while meeting student nutritional needs. Menus would also have to be flexible, offering a variety of foods. Reducing the length of lunch periods and developing faster serving methods would also help eliminate the mass exodus at lunch.

One of the new program's major priorities was to create a desirable dining room atmosphere—not the typical dull, noisy, institutional eating area. The new building was designed with two dining rooms, instead of one, with windows overlooking a landscaped courtyard. The dining rooms were paneled in bright, cheerful green, purple, and orange. New small round and square dining room tables and comfortable plastic chairs enhanced the seating arrangement.

Separate buffet-type serving areas were also established. Food, prepared in a separate kitchen, would be wrapped and held at proper temperature in a self-service line. Eventually food would be prepared in the new city-wide Nutrition Center which was also in the planning stage. Food service workers would only be needed to load the line and collect tickets or cash during serving time.

After the new lunch rooms were built, the next step was to "sell" the students on the program. Inserts in the daily bulletin such as, "What was the secret meeting all about between Mrs. Riley, Lorraine Mell, and Mrs. Schnickels?" and "Green knows all about it," ran for two weeks to increase interest in school lunch. The initial reaction was, "Who is Mrs. Schnickels?" We felt this was a good start which prompted student response.

Later bulletins introduced interesting food service facts with "did you know that . . ." Additional flyers were sent to teachers along with USDA literature on the Type A lunch and how nutrition and education work together.

The next plan of action was to form a student advisory committee to help plan menus that the students liked. After orientation on Type A requirements and budget limitations, the 18 student volunteers conducted their own weekly meetings and planned an average of one menu a week. They recommended serving cheeseburgers, hot beef sandwiches, and tacos. They also planned special meals for Christmas and the Bicentennial and sponsored a Soul Food Day. The committee is now helping plan the cycle menu for a full year.

In addition, the students designed their own merchandising program. Their posters suggested, "Buy a student lunch today. It is Super . . . Super . . . Super" and "Did you know that the first student-planned menu will be served Wednesday, November 20th? It's delicious."

Food service participation at North High has increased by 250 Type A lunches per day since the implementation of the student committee. The high school now averages 700 student lunches a day out of an enrollment of 1200. When "Chuckwagon" sandwiches (hot bologna and cheese on a bun) are served, student participation jumps to 850.

The student advisory committee has helped improve student participation, cut down on plate waste, and increase nutritional awareness. North High now has the highest school lunch participation in Minneapolis, and this program is now being instituted throughout the city's high schools.

Behavior Modification

Two studies designed to examine the effectiveness of several weight control techniques while providing long-term follow-up data are described. Both studies made nutrition education an integral part of the treatment program.

Nutritionists with no formal behavioral training conducted the first study from a detailed treatment manual. It was hoped that success with this manual would make wide-scale dissemination of behavior modification possible.

In the first study, overweight subjects were divided into behavior therapy and food exchange groups. The behavioral group compiled detailed food records, while learning to control eating stimuli and block inappropriate responses. The other group learned the food exchange system and calculated diets based on food intake and energy needs.

No significant differences in weight loss were observed between the two groups. However, at the final follow-up, the behavior treatment group maintained approximately 70 percent of the weight loss achieved during treatment while the other group did not do as well.

The second study again used nutritionists as therapists. However, these nutritionists received minimal behavioral training to determine if improved behavioral techniques would also improve the effectiveness of the program.

In this study nutritionists conducted two behavioral treatment groups, one using the same behavioral approach as the first study and the other using a stimulus-control approach. Nutrition information was built into both treatments.

Weight loss between the two groups was not significantly different at the end of the study. There was, however, a significant difference in favor of the stimulus-control treatment at the three- and six-month follow-up. Again, after 18 months, the stimulus-control subjects were maintaining 80 percent of achieved weight loss compared to 50 percent by the other group.

Studies concluded that nutritionists trained in behavioral methods can produce good weight losses and can make this type of treatment more available to the public.

Paulsen, B.K., Lutz, R.N., McReynolds, W.T., Kohrs, M.B. 1976. Behavior therapy for weight control: Long-term results of two programs with nutritionists as therapists. Am J Clin Nutr 29(8):880 (Aug.).

Time Out. Since many obese people seek comfort in food during stress, a temporary "time out" provides an immediate detachment. It disrupts the stimulus-inappropriate response sequence and allows clients to return to a situation with greater control and insight.

A "time out" image may involve imagining a favorite place or becoming an astronaut and going on a relaxing journey through space.

Rehearsals. Mentally rehearsing future behavior allows students to practice appropriate adaptive responses. Many people know the appropriate response but are unable to make it themselves. After carefully constructed "internal practice," they are more likely to perform the desired behavior in the future.

This rehearsal can be used to overcome problems as simple as getting up in the morning. Procrastinators who prefer to lie in bed can rehearse getting up and putting on their clothes. After watching themselves do it, it is easy to turn off the daydream, get up, and go through the motions planned.

Consequences. With images, it is possible to mentally try out several alternatives while avoiding their actual, unpleasant consequences. Thus, costly, pound-adding, trial and error is avoided.

Consequating can help overweight clients resist excessive eating. When I have an inappropriate craving for a rich walnut dessert, I imagine myself trapped in a container of it. I can't get out. The cold comes all over me—I'm freezing; I'm struggling; I couldn't eat another bite, I'm so sick of it. The walnuts are bruising my nose. This, for me, is a real turnoff.

Positive Reinforcement. Potent positive images can be effective rewards in themselves for appropriate inner or overt eating responses. Imagined positive reinforcement is particularly effective when clients cannot find something to reinforce their behavior or when they need an immediate easily available reinforcer.

A good mind trip, such as an imaginary testimonial dinner in their honor, reminds them that they are worthwhile and reinforces their behavior.[3]

Application of Imaginal Skills

The ability to construct and experience vivid scenes such as these varies considerably. In the most vivid, effective imagery, clients *see* what is going on and experience it in the present tense with all their senses. Dr. Singer describes it as the difference between barking *like* a dog and *being* a barking dog. The latter is the level at which imagery is experienced.[1]

Psychologists disagree as to whether or not everyone has this skill. I have not yet encountered a client incapable of producing some degree of imagery. If they can worry and conjure up pictures of dire future consequences, students can probably learn to engage in positive imagery.

Imagery can be a useful tool in helping overweights redirect eating behavior and attitudes toward food.

Hopefully, the information presented on imagery training will suggest new ideas and procedures for those concerned with obesity. Consider incorporating imagery into a total weight control program. It generates greater ingenuity, less discomfort, and increased permanence other approaches have been unable to offer. And, once learned, imagery can also be used to handle other problems such as lack of confidence, self-destructive habits, and irrational fears.[4]

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2. *Stern, F., Hoch, R.S. 1976. Mind Trips to Help You Lose Weight. New York: Playboy Press.*
3. *Mercer, M. 1976. Mind Exercises That Reduce Your Body. McCall's 103:72+ (Jan.).*
4. *French, J. 1976. The Power of Positive Daydreaming. Glamour 74 :191+ (Aug.).*

About the Author

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Dr. Stern, Associate Professor of Psychology at Kean College of New Jersey, is also Director of the Institute for Behavioral Awareness.

Formerly overweight, Dr. Stern has collaborated with Ruth S. Hoch on **Mind Trips to Help You Lose Weight.** She also produced a record and cassette which guide the listener through 10 mental images. Dr. Stern has written **How to Live with Psychology and Maybe Learn to Like It** and "Ethnicity and the Acting out of Aggression." She has conducted seminars and short courses in awareness training throughout New York and New Jersey, in addition to making television and radio appearances.

Worth Noting

Vitamins: Their Use and Abuse. 1976. By Joseph V. Levy and Paul Bach-y-Rita. New York: Liveright.

The authors, concerned with the confusing and conflicting information available on vitamins, wrote **Vitamins: Their Use and Abuse** to advise consumers to know the product and check the claims before purchasing vitamins.

Biomedical evidence of the need for vitamins, and what vitamins can and cannot do, gives readers a basis for reviewing and evaluating vitamin claims and counterclaims.

Credible, scientific discussions of vitamins and vitamins in relation to other substances are documented throughout the life cycle in health and disease.

Realities of Nutrition. 1976. By Ronald M. Deutsch. Palo Alto: Bull Publishing Co.

Accurately and well written, **Realities of Nutrition** discusses both the illusions and the realities of nutrients. Food science, production and marketing, labeling, food-borne illnesses, and how to effectively communicate scientific data about food and nutrition are also covered.

An analysis of food guides points out their shortcomings. Additional, realistic precepts of good nutrition are needed if people are to make food choices which provide a balance between the foods to eat and nutrient needs throughout life.

"Tests" are given to help laypeople distinguish the illusions from the realities about food while answering the question, "What shall I eat?"

From National Dairy Council

Food . . . from Birth to Birthday was designed to help mothers feed their babies through the first year. This booklet discusses breast and bottle feeding, introducing solids, weaning, and teething. A chart on the last page summarizes infant feeding practices according to age. Nutrients, their functions, and food sources for the baby are also given. B205. 27¢.